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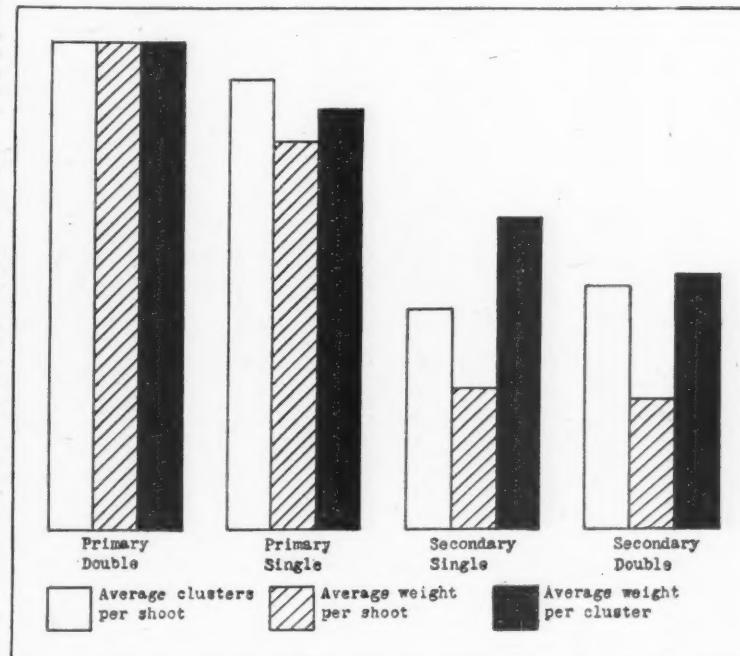
MARCH, 1927

No. 3.

Some Tendencies in Grape Pruning

By C. B. Wiggans

University of Arkansas



Graph showing the relative value of fruiting shoots arising from secondary and primary buds. Note that the primary bud shoots arising at nodes from which secondary bud shoots also come (called primary doubles) are superior to other shoots in every respect. Primary bud shoots arising from nodes where only one bud grows are slightly inferior to the primary doubles but far above the secondary bud shoots.

FRUIT PRODUCTION OF SHOOTS AND CLUSTERS

	Primary Double. ¹	Single. ²	Secondary Single.	Double.
Average number of clusters per shoot.....	2.69	2.48	1.22	1.36
Average weight of fruit per shoot in ounces.....	11.68	9.30	3.39	3.12
Average weight per cluster in ounces.....	4.34	3.74	2.78	2.27

¹Double applies to nodes from which a primary and secondary bud grew.²Single applies to nodes from which only one bud started.

junction between the "Bull" cane and its branches or laterals.

Fruit Buds

The "eye" located at each node or joint of the grape cane is composed of a group or cluster of buds varying greatly in their fruiting possibilities. The largest and central bud is designated as the "primary bud." Barring accidents, this is the bud which grows into a succulent shoot, which in turn bears from one to six clusters of fruit, depending on the variety and the environment. The primary bud is surrounded by two or more secondary buds. When the primary bud is killed by frost or some other cause, one of the secondary buds will often escape injury and produce a part crop. Under some conditions, both the primary and one secondary bud grow from the same eye.

A study of tagged shoots from the various kinds of buds was made the past season. The primary buds were found much superior to the secondary buds in average weight of fruit produced per shoot and per cluster and in the number of clusters per shoot, but they had no larger berries. The primary buds at the nodes from which secondary buds also started, were more productive than primary buds at nodes from which no secondaries started. The shoots from secondary doubles produced more clusters per shoot, but slightly less weight per shoot, than the shoots from secondary single buds.

Amount of Wood to Leave

Since at pruning time the eyes contain the potential crop, the bud becomes the unit of measure for the amount of fruiting wood left.

Investigators have shown that a vine is capable of producing fruit in very close proportion to the amount of growth made the previous season. Therefore, the amount of wood or the total number of buds left on a vine should be governed by the vigor the past season. In New York and Michigan, 35 to 50 buds is commonly recommended as the proper number to leave on the average vigorous vine. In Arkansas, we have found 60 buds to give greater yields with no apparent reduction of quality or weakening of vine vigor. This difference may be explained by the longer growing season of the southern location. Vines in the Welch vineyard four miles west of Springdale, Ark., pruned to approximately 60 buds, yielded 6.4 tons per acre in 1926, as compared with 5.8 tons for vines pruned to approximately 48 buds.

Summer Pruning

Is summer pruning of Concord grapevines advisable? It is a widely used practice in some localities. An experiment conducted at the Arkansas station the past year indicates strongly that anything, whether it be pests or shears, which reduces the leaf area has deleterious effects on the immediate crop.

A month previous to the normal ripening season, eight-year-old Concord vines were summer pruned in various ways for comparison with vines receiving no cutting. The most severe treatment given was complete

(Concluded on page 31)

Editorial Contents

Some Tendencies in Grape Pruning, by C. B. Wiggans.....	3
Crown Gall and Graft Knots of Apples, by I. E. Melhus.....	4
Soil Management in Northwestern Orchards, by W. A. Luce.....	5
Apple Varieties and Fruit Setting, by F. S. Howlett.....	7
Compatible and Incompatible Graft Unions, by W. L. Howard.....	8
The Apple Marketing Problem, by C. E. Durst.....	10
The Strawberry Industry of Oregon, by C. E. Schuster.....	22
Rootstock Developments in California, by M. J. Heppner.....	26
Standard and Dilute Sprays, by F. H. Ballou and I. P. Lewis.....	28

EDITORIAL

Adaptability of Localities and Sections to Fruit Growing
—Boosting Agriculture to Sustain Business—Change in
National Policy Needed—Inequalities in Taxation—Farm
Relief Bill Passes

DEPARTMENTS

The Editor's Mail Box.....	14	The Orchard Home Department.....	34
With the Co-ops.....	16	Chats with Fruit Grower's Wife.....	36
Markets and Marketing.....	18	Patterns.....	38
Engineering for the Fruit Grower... 32		Beekeeping for Fruit Growers.....	40
		Profitable Poultry	42

Crown Gall and Graft Knots of Apples

By I. E. Melhus

Iowa State College

GALLS and knots on apples have been known to the apple grower and nurseryman for more than a century. There is probably no other disease that causes greater loss in the nursery or piece root grafted stocks than this one disease. It frequently causes the loss of every other tree in some varieties. In the orchard, it has shortened the life of many trees. Budded apples are not as generally attacked as grafted trees by this disease, but on the other hand their production is more expensive and they are not popular for planting in some sections.

Cause of Crown Gall

The cause of crown gall remained a subject for speculation and conjecture until 20 years ago, when Dr. Erwin F. Smith, an employee of the United States Department of Agriculture, showed that bacteria were the cause of galls on apples and many other plants. He obtained from certain swellings or overgrowths a bacterium that produced galls when introduced into other healthy apples. In his later work he showed that this bacterium migrated inside the stems of plants, giving rise to galls or swellings at some distance from the point of initial infection. In other words, this bacterium might produce a gall at the point of introduction, following which other galls at some distance from the first or primary gall might develop. At the same time, he showed that when this bacterium was introduced into the growing point of a plant, galls formed, on which shoots, flower buds and roots might develop. He also succeeded in inducing hairy root, such as commonly occurs on nursery stock, with this bacterium.

It may truly be said that the finding of a bacterium in plants possessed with the power of inducing galls, hairy root, typical plant structures on the surface of an aerial gall, as well as secondary galls a foot or more from the primary gall, was indeed a series of wonderful discoveries that is without parallel in the plant world today. Here was a living organism, so small that the highest power of the microscope was needed to see it, that could induce tumor-like growths on plants, not only on apples, but also on hundreds of other plants, as peaches, raspberries, willows, poplars, sugar beets, daisies, roses, alfalfa, etc. The crown gall organism is not particular what plant it attacks, and in each and every case large swellings or galls result.

Not only did these discoveries have a profound influence in the plant sciences, but also in the animal sciences. The effects produced by this bacterium in plants in many ways were similar to those produced by cancer in animals, and the students of human and animal cancer were stimulated to look for a bacterium or some other organism that might be the cause of the cancer scourge of the human race, which so far has successfully eluded all the efforts of hundreds of scientists. Already, much valuable information regarding tumorous growths in animals and man has been secured, due to the stimulus of Smith's discoveries.

All Root Swellings Not Due to Crown Gall

It is easy to understand that following these phenomenal discoveries, scientists and nurserymen, and orchardists as well, were inclined to think that any swelling, knot or hairy root formation resembling Smith's galls were due to this bacterium. Such was the impression and status of our knowledge of the crown gall problem until three years ago, when the Crop Protection Institute, a branch of the National Research Council, through a grant from the American Association of Nurserymen, interested itself in the crown gall problem. Through its corps of workers, it has been definitely shown that less than 20 per cent of the knots on piece root grafted apples are due to a bacterium. This

was determined by collecting hundreds of trees bearing overgrowths from many different nurseries distributed through 14 different states and testing for the presence of the bacterium in the swellings. It was found

not doubted, and it cannot be questioned that graft knots are produced on piece root grafted apples without the intervention of any living organism. In other words, at least four-fifths of the swellings on piece root

at the end of the scion lip. A knot may form, however, at any point on the union, either from the scion or stock tissue. The tissues laid down at this point result from the stoppage of the downward flow of food materials on that side of the graft where continuity does not exist. A knot at the union on two-year-old piece root grafted trees very frequently, therefore, is a sign of a partial break in the continuity at the point of contact between the two elements, stock and scion of the tree.

Knowledge of how these graft knots are formed, and that they are not caused by a living infectious organism, leads us to inquire as to their possible injury to apple trees for orchard planting. As yet no orchard trials have been made with trees known to bear only graft knots. There has not been time, but recent laboratory trials shed much light bearing directly on this point. One of the investigators of the Crop Protection Institute took trees bearing graft knots and galls and measured their water conducting capacity through that part of the stem bearing the overgrowth in comparison with that of healthy trees free from galls and graft knots. In one lot of 100 "two-year-old cut backs," bearing graft knots and galls, the water flow capacity was reduced 30 per cent compared with that from normal trees of the same age and varieties. In another lot of galled and graft-knotted trees of the varieties Wealthy, Salome and Jonathan, the water flow was reduced 69, 21 and 42 per cent respectively.

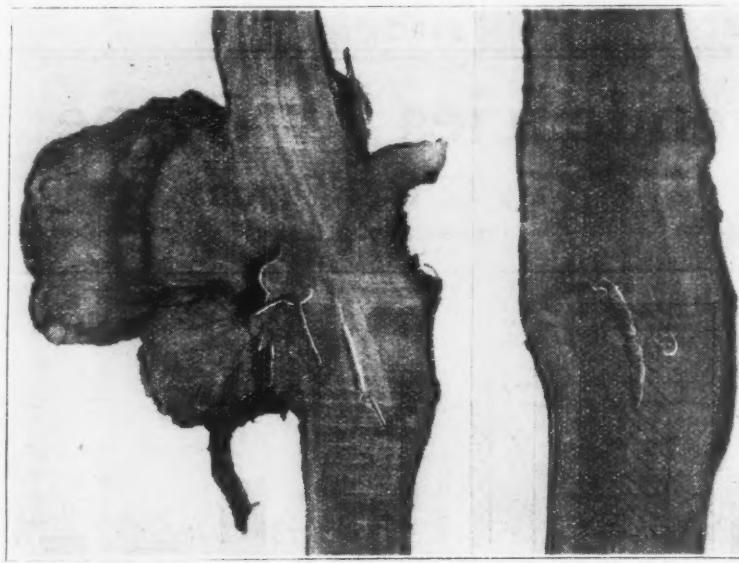
Free Passage of Water Important

It need not be argued that water is absolutely essential for growth and that any interference with its passage from the roots to the leaves spells, ultimately at least, reduced growth. There are places in this country where apple trees are required to give off great quantities of water per day, and in such cases there must be an open, free passage of the water from the roots to the leaves. There must be no twisting or distortion of the water vessels in the vascular system such as result from galls and graft knots at the union. Neither can there be any break in continuity. We know that galls and graft knots may have this effect on the development of the vascular system of a young tree. It has already been stated that lack of connection often exists between scion and stock where a large graft knot has developed. Longitudinal sections through the union of trees bearing graft knots showed that in 63 per cent of the cases the lack of connection between stock and scion was plainly evident. In the other 37 per cent, the relationship between the callus tissue and the two elements of the tree was not so plain.

Trees with Overgrowth Grow Slower

Although there has been insufficient time for orchard trials, it has been observed in an orchard set for crown gall study by the Iowa Agricultural Experiment Station that both Jonathan and Wealthy trees bearing galls or graft knots have made a poorer growth than normal ones, also that trees bearing large graft knots after 12 years in the orchard have made a one-sided development, and that on that side of the tree above the graft knot the top was small and the trunk concave. The roots of such trees were located largely on the side opposite the graft knot. It would seem unwise for an orchardist to take a chance on such a tree. No orchardist can afford, it seems to me, to set a tree that is not absolutely normal. Such being the case, the question as to whether a gall or a graft knot does or does not injure the tree is not a pertinent one. No orchardist should accept galled or knotted trees for planting. This means that no nurserymen should offer them for sale, and I find that no conscientious nurseryman wishes to do

(Concluded on page 41)



Longitudinal sections through galled and healthy apple trees. At the left is shown an infected tree in which the gall caused a break in the vascular system. At the right is shown a healthy tree in which there is no break in the continuity of the water-conducting vessels.

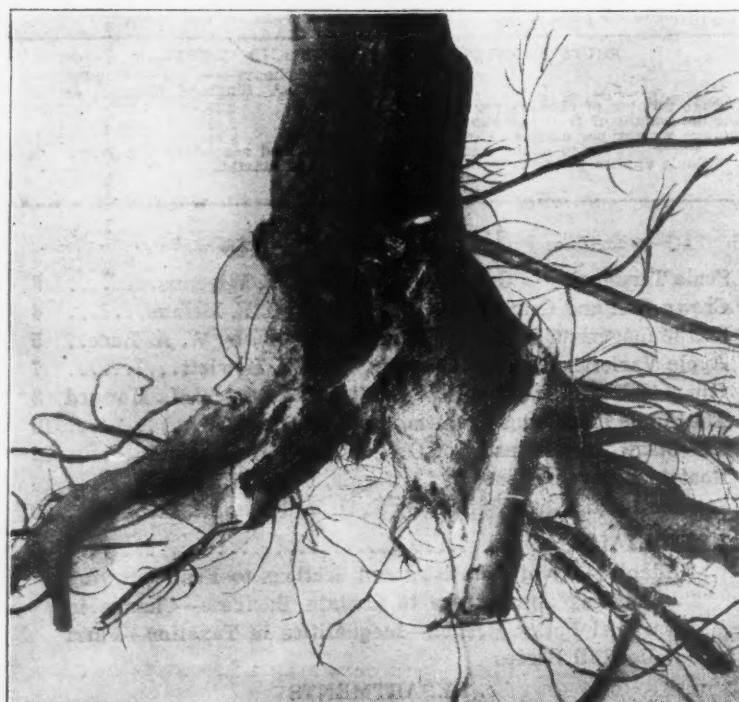
that lots of trees could be collected by special effort that showed as high as 76 per cent of infection, but when the general run of trees with swellings were taken, less than 20 per cent yielded in test the bacterium responsible for crown gall. Proof that this finding was correct was gained another way: first, by producing knots in the absence of this bacterium in the greenhouse; and, second, by actually growing apple grafts on steam sterilized soil in the field. In other cases, the bacterium was actually put into wounds on the trees and galls produced. The capacity of Smith's bacterium to produce galls is

grafted nursery stock are due to some other cause.

This means we have an infectious and a non-infectious type of overgrowth. The latter far outnumbers the former. The infectious overgrowth is, of course, crown gall, and the non-infectious type we may call graft knot, in accordance with nursery practice, when it occurs on the union of piece or whole root grafted apples.

Graft Knots

These graft knots consist of callus tissue formed in the process of healing of the stock and scion at the union. They are formed most often



Crown of a 12-year-old Jonathan knotted when set in the orchard. The cavity developed from decay of the gall knot. Note the concavity in the trunk above the cavity and also the fact that there are no roots emerging from the side of the tree bearing the knot.

Soil Management in Northwestern Apple Orchards

By W. A. Luce

APPLE ORCHARDS in the irrigated districts of the Pacific Northwest are noted for their heavy annual production. Is the soil in these districts any richer or productive than the soils in other orchard sections? I think not. The growers in these districts are confronted with practically the same soil problems as the apple growers in eastern non-irrigated sections.

While the soils of the apple sections in the Northwest may vary from a coarse gravelly loam to a heavy silt or clay, the general soil practices do not vary greatly. Certain practices may need more emphasis than others, but the principles involved are the same.

Climate Semi-Arid

Nearly all commercial plantings of apple trees in the Northwest are in semi-arid sections, thus making irri-

gated sections of the Pacific Northwest are noted for their heavy annual production. Is the soil in these districts any richer or productive than the soils in other orchard sections? I think not. The growers in these districts are confronted with practically the same soil problems as the apple growers in eastern non-irrigated sections.

Phosphorus and Potash Plentiful

The same climatic conditions in our arid sections that caused our nitrogen supply in the virgin soil to be low have caused our supply of phosphorus and potash to be very abundant. While chemical analysis does not indicate the available supply of these materials to the tree, the basic amount in our soils is shown by com-

there are some growers who are absolutely sold on one or the other.

I believe the sale of complete fertilizer in the irrigated apple districts of the Northwest has been increasing, if I can judge by the fertilizer report of the Wenatchee district. This district spends annually approximately \$125,000 for commercial fertilizer. The report for 1922 shows that 1040 tons of nitrate of soda and sulphate of ammonia and 570 tons mixed fertilizer were used. In 1925, 1005 tons of nitrogen-bearing materials and 882 tons of mixed or phosphorus-bearing fertilizers were applied.

Education of the grower seems to be the best means of solving a problem of this kind. If experimental data show that results are secured from nitrogen only, growers should purchase fertilizer on the basis of the cost of a pound of nitrogen, taking nitrate of soda or sulphate of ammonia as standards. When the problem is viewed from this standpoint, organic forms of nitrogen must be given a high rating.

Importance of Physical Condition

Most of the experimental work on soils in the Northwest has been related closely to fertility and the effect on crop production. While there are many details to be worked out yet on the amount, method and time of application, the fertilizer practice is fairly well stabilized. The relation of fertilizing to cover crop management is not thoroughly worked out yet and is really a long term project.

Lack of organic matter in the virgin soil, intensive cultivation and constant irrigating on the surface soil has caused a physical soil problem that now overshadows the fertilizer question. Soils containing much silt or clay and which are low in organic matter are very subject to hard pan

severe conditions of hard pan, supplementary methods have been found necessary.

Alfalfa

Alfalfa, vetch and sweet clover make up at least 95 per cent of the cover crops used in the Northwest. The permanent alfalfa cover crop is used very extensively and functions best when left uncut and allowed to go back into the soil. Fall disked is practiced less each year. It is done generally when there is danger of mice injury or as the dry alfalfa may act as a fire hazard in the orchard. Spring disked is beneficial in working the organic matter into the soil and leveling off the old ditches.

Vetch and Sweet Clover

Vetch has proved itself to be a fast top soil builder and functions best on sandy or shallow soils. It is perhaps one of the best legumes to use when the water supply for irrigation is limited during the latter part of the summer, as the vetch goes to seed and dries up at that time, requiring no moisture until fall, when it reseeds. Vetch is sensitive to shade and will not thrive in a thickly planted orchard. A combination of vetch and alfalfa often makes a good cover crop when first being established in an orchard, as the vetch makes a quick early growth and acts as a nurse crop for the alfalfa.

Both the annual (Hubam) and the biennial sweet clover thrive in the semi-arid soils of the Northwest. While these cover crops are much more inconvenient to handle, they have considerable merit as fast soil builders in organic matter.

Plowing and Subsoiling

Plowing in the orchard is not an uncommon practice. Soils with a hard pan condition are helped temporarily with increased water penetration. Shallow plowing is often practiced instead of disked to increase the efficiency of the cover crop. Shallow spring plowing will greatly reduce the stand of the permanent alfalfa crop



This orchard has no legume cover crop, and a heavy growth of grass started (Courtesy Wheeler's Photo and Gift Shop, Wenatchee, Wash.)

gation an essential practice. The original growth of vegetation was mostly sage brush and bunch grass, although a considerable acreage is now planted on pine land. In all cases, the amount of organic matter in the original soil was very low. Lack of rainfall and leaching, however, had preserved much available mineral plant food in the soil. Intensive cultivation and plenty of water resulted in remarkable growth and production by trees set on virgin land. Cultivation soon failed to give the necessary growth, however, and some other methods were sought to restore production.

Nitrogen Limiting Factor

Nitrogen, whether supplied through commercial fertilizer, barnyard manure or a legume cover crop, gave immediate results in increased growth and production of fruit, when used in the clean cultivated orchards. Experiments conducted throughout the Northwest show nitrogen to be of major importance in securing tree vigor. This is not hard to understand when the low organic content of the original soils is taken into consideration.

Nitrate of soda and sulphate of ammonia are the chief sources of quickly available nitrogen used by the growers of the Northwest. Fertilizer reports of the Wenatchee district show sulphate to be gaining in popularity. This is very likely due to the ease of distribution in the orchard and the dislike of the sodium residue left by the nitrate of soda.

These fertilizers are applied either in the fall or very early spring. The type and depth of soil and the amount of winter moisture will influence the time of application. It is merely a question of incorporating the fertilizer well into the ground before growth starts in the spring. One moderate application of a readily available nitrogen fertilizer will usually promote a vigorous growth during the

parative figures. The following table shows the approximate amount of nitrogen, phosphorus, and potash in the top 10 inches of soil in the average Wenatchee soil and that in average orchard soils in West Virginia and New York state:

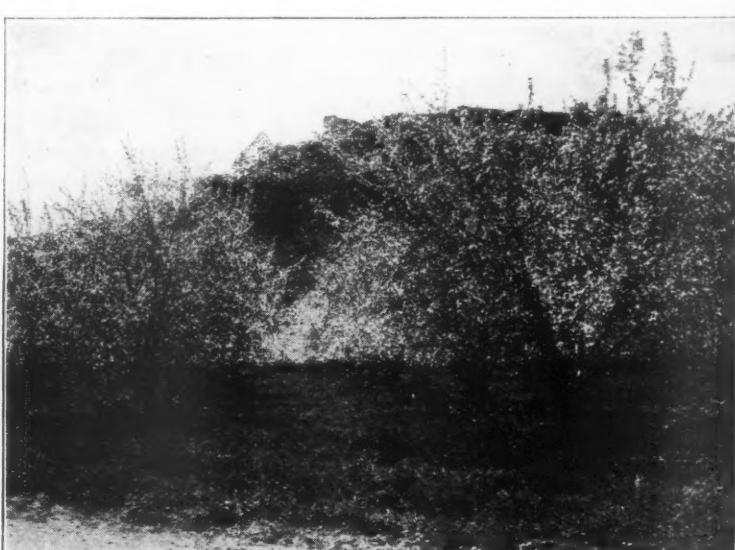
	Nitro- gen. (Lb.)	Phos- phorus. (Lb.)	Potas- sium. (Lb.)
Average Wenatchee soil	2.170	7.010	42.900
West Virginia soil*	2.230	.785	33.100
New York soil†	6.080	2.660	25.550
*W. Va. Agr. Expt. Sta. Bul. 174.			
†N. Y. (Geneva) Agr. Expt. Sta. Bul. 339.			

Our supply of phosphorus and potash appears sufficient for considerable time to come. Building up the organic content of our Northwest soils for the purpose of liberating the stored phosphorus and potash is of extreme importance, however.

Fertilizer tests throughout the Northwest have never shown any beneficial results from the use of phosphorus and potash. Although tests have not been carried on as long as in the East, the results tally very closely.

Use of Complete Fertilizers

The addition of excessive amounts of nitrogen fertilizers and the crowded condition of the trees in many of the orchards of the Northwest have increased the amount of poorly colored fruit during the last five years. The average grower at once blames the soil for his poor results and desires a chemical analysis to determine what is lacking. In view of the circumstances, the fertilizer salesman has little trouble in convincing the grower that a complete fertilizer will balance his soil condition and give the desired quality in his fruit. It may be also that the grower will invest in an application of lime to bring back the color on his fruit. While I know of no experimental data in the Northwest showing favorable results from lime or complete fertilizer on apple trees,



This picture shows the amount of growth made by an alfalfa cover crop at apple blossoming time (Courtesy Wheeler's Photo and Gift Shop, Wenatchee, Wash.)

conditions that materially affect the penetration of the irrigation water. Fruit trees carrying a heavy load of fruit during the extreme heat of the summer must have a steady and abundant water supply. This supply cannot be kept constant if the soil does not allow sufficient water penetration.

Legume cover crops were first planted in the Northwest to supply a cheap source of nitrogen to the trees and to add organic matter to the soil to improve the physical condition. Results were almost immediate in increasing tree vigor, but the improvement in soil condition has been very slow. In

and should be avoided when a heavy stand is desired.

Subsoiling to break up the hard pan condition is another temporary relief measure which is used to insure greater water penetration. There is always danger of severe root cutting when this process is employed, and subsoiling close to the tree should be avoided. Running the subsoil ditch at right angles to the irrigation furrow will give the greatest relief with the least number of subsoil ditches. This subsoiling will be of greatest benefit if done just before irrigation starts (Concluded on page 41)

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Adaptability of Localities and Sections to Fruit Growing

IN THE last few years fruit has been planted extensively in a number of new sections and localities of the country. In some cases, the adaptability of the section or locality for fruit has been proved; in others, it has not. The trees in many places have been coming into bearing and the results are just what we should expect under the circumstances. In some places, the fruit crops have met expectations, while in others they have not. In some instances the crops have appeared to be generally satisfactory, but defects have developed in one or more important particulars. We know of one locality in which a large acreage of peaches bore the first crop this season. Unfortunately, the peaches had poor carrying quality and went down badly in transit. Growers were inclined at first to blame the railroads, the shippers and dealers, but as the season advanced and inspection reports could be carefully compared, it was quite apparent that the difficulty was due to an inherent lack of carrying quality in the peaches of the locality.

In developing new fruit sections, we are going to meet more than one situation of this kind. In some instances, of course, the difficulty may be due to a peculiar weather condition of the season. In others, however, it may be due to some fundamental condition of the soil, of the drainage, or of the exposure, that cannot be completely corrected.

In localities in which the latter condition prevails, the growers are in a most unfortunate situation. Unless the condition can be corrected, they will never be able to compete successfully with other sections. They will always be operating at a handicap, and they will never be able to build up a reputation for high quality fruit. Of course, we should not reach conclusions hastily in such matters, for it may be that the results are due to one particularly unfavorable season, or it may be that the conditions can be corrected by soil treatment, etc. If, however, we find that the trouble is due to some fundamentally unfavorable condition, then the only sensible thing to do is to go out of the business as soon as we conveniently can. It does not pay to

continually attempt to thwart nature. As we develop more and more new fruit sections, we shall find that fewer of them than we supposed are well adapted for growing the highest quality of fruit.

Boosting Agriculture to Sustain Business

IN ALL probability, the business and industrial conditions which are in prospect have been responsible, in part at least, for the change in attitude which many financial and business leaders have taken recently toward farm relief.

Although it is not generally admitted, financial and business leaders recognize that a recession in business is in prospect. Building activity is decreasing in many cities. According to reports, new business of importance can be obtained in the iron and steel business only through price concessions. Automobile production is the lowest since 1922. In the world market, the balance of trade in favor of exports is decreasing.

With such conditions facing financial and industrial leaders, it is quite likely that many of them saw in the passing of the farm relief measure the possibility of increasing the buying power of agriculture and in this way sustaining business activity for a time at least. As a result, the recession taking place in other directions would be offset to some extent.

No doubt there is considerable justification for the taking of such a viewpoint on the part of financial and industrial leaders. It is a question, however, if the purchasing power of agriculture can be stimulated rapidly enough through the passage of the farm relief measure to have the desired effect.

Change in National Policy Needed

DR. HENRY A. TAYLOR, formerly chief of the Bureau of Markets and now a member of the faculty of Northwestern University, made a point recently in a talk given before the Agricultural Club of Chicago which deserves attention.

In response to remarks made by a previous speaker, Dr. Taylor stated that while the development of more efficient production methods in agriculture was a very desirable thing, it could not bring about a change in the policy of the country with reference to the distribution of the national income. This, he pointed out, is the greatest problem facing agriculture, one which is fundamental in character and one which can be corrected only by appropriate legislation.

Inequalities in Taxation

FIGURES recently made public by Roger Babson show the percentages of the net profits of various occupational groups which are paid out as taxes. The figures are as follows:

	State Taxes.	Federal Taxes.	Total Taxes.	Per cent	Per cent	Per cent
Agricultural and related industries	64	19	83			
Mining and quarrying	44	16	60			
Transportation and public utilities	28	8	36			
Construction	17	15	32			
Finance, banking, insurance	22	9	31			
Wholesale and retail trade	15	12	27			
Manufacturing as a whole	14	10	24			

No one can contemplate these figures without reaching the conclusion that the taxation policy of the country needs readjustment, especially from the standpoint of agriculture.

Notwithstanding the fact that such great inequalities exist as shown by these figures, there are many persons going about the coun-

try shouting that more efficient production will solve the entire agricultural problem. If it were possible for more efficient production to solve the farmer's problems, he would most certainly be compelled to use far more efficient methods than are used in any other line of business or industry in existence. Otherwise, he could not overcome the inequalities that are heaped upon him as a result of an unbalanced taxation system and a national economic policy which gives agriculture a proportion of the national income that is entirely out of keeping with the amount of money invested and the number of people engaged in it.

Taxation is one of the several things which needs serious attention by the government, state and local authorities.

Farm Relief Bill Passes

AT THE TIME this issue goes to press, the farm relief bill has been passed by both houses of Congress with comfortable margins. Strong opposition was met in both branches, mainly from eastern sources, and numerous attempts were made to amend the measure or to substitute other bills for it, but in each case the opposition was out-voted with ease. In fact, it is stated that the friends of the bill did not even take the trouble to answer the arguments of the opponents in many cases. The bill will now go to the President. Some persons say he will sign it; others think he will veto it.

The farm relief bill has had a most interesting history, and its history throws some interesting sidelights on American thought and progress. Several years ago when the idea of making the tariff apply to agriculture was first proposed, it was widely proclaimed as radical. It now appears that this was due to misunderstanding or lack of understanding of the principles of the bill. As time has passed and education has progressed, thinking people all over the country have gradually changed their minds with reference to the matter. Although there are still many who hold that the measure is not justified, there are many bankers, editors, business men and politicians who have changed their attitudes from one extreme to the other. Many who fought the legislation bitterly some time ago, including editors and publishers of some of the large metropolitan papers, have recently become supporters of the proposition, which they now concede is reasonable and in the interests of Americanism.

Because of the way sentiment has changed regarding farm relief, two things are apparent. In the first place, the measure undoubtedly has merit, for with the searchlight turned on it as it has been, no measure without merit could even survive, much less increase in popularity. In the second place, it is quite apparent that the thinking people of America, although sometimes slow to see through a new thing, are big enough and broad enough to change their viewpoints, to reverse themselves entirely, and to throw their prides to the wind, when, through education and understanding, they reach the conclusion that after all a measure has real merit. We hear a lot these days about the decay of civilization and about the deficiencies of a democracy, but with people big enough to change their minds as they have on this question, we have faith that the American republic will survive for sometime to come.

The important question now is, "What will the President do to the bill when it reaches his desk?" Will he see fit to change his mind in view of the tremendous amount of evidence which has undoubtedly passed before him? Many other prominent leaders who have taken fully as strong a stand as he has taken against the bill have been able to do it. We hope that he will be able to do it also.

Apple Varieties and Fruit Setting Factors

By Freeman S. Howlett

Ohio Agricultural Experiment Station

APPLE VARIETIES differ in their response to the various factors which influence fruit setting. It is true that trees to set fruit must be vigorous and healthy. Their flowers must be adequately cross-pollinated. Severe frosts must not occur during the period of blooming and early development of the fruits. The growth of the developing flowers and young fruits must not be checked by lack of sufficient water. If any one of these or other conditions of fruitfulness is not fulfilled to a degree at least, sufficient fruits will not set for a commercial crop. When these conditions are only partially fulfilled, the various apple varieties differ in fruitfulness.

Importance of Cross-Pollination

During the last few years the failure of flowers to set fruit has occasionally been laid to inadequate pollination rather than to other conditions whose effects have not been appreciated. This over-emphasis on pollination does not mean that apple varieties do not require adequate pollination. In commercial orchards of large blocks of one variety, in city yards where individual trees are planted, or in orchards of two varieties, only one of which is capable of effectively pollinating the other, unsatisfactory yields are more likely to be due to inadequate pollination than to any other factor (assuming the occurrence of no frosts).

Recent studies at the Ohio Agricultural Experiment Station have supported the work of several other experiment stations in indicating that the varieties Baldwin, Delicious, Golden Delicious, Grimes Golden, Jonathan, McIntosh, Nero, Northern Spy, Rhode Island Greening, Rome Beauty, Stayman Winesap and Wealthy are not sufficiently fruitful when self-pollinated to give satisfactory commercial crops. No evidence has been obtained which indicates that maintenance of these varieties in exceptional vigor will make them sufficiently fruitful when self-pollinated. Moreover, certain of these varieties—Baldwin, Nero, Rhode Island Greening and Stayman Winesap—are of little value as pollinizers for other varieties, although they will unquestionably produce at least a few fruits. Delicious, Golden Delicious, Grimes Golden, Jonathan, McIntosh, Northern Spy, Oldenburg, Rome Beauty, Wealthy and Yellow Transparent are effective pollinating varieties.

However, despite the fact that inadequate pollination decreases the set of fruit under certain conditions, it generally has been given greater importance relative to other factors than it deserves.

Position of Flowers in Cluster Important

It is becoming more evident that to understand the factors affecting fruit setting, a knowledge of the fruit setting characteristics of the various varieties is desirable. Varieties show differences in the ability of the flowers of their clusters to set fruit. The four to seven flowers of an apple cluster are not alike in position. One flower is centrally located in the cluster, that is, in a terminal position, while the others are

grouped spirally around this central flower. The central flower opens two or three days before the lateral flowers and is consequently ready for pollination that much sooner. It is usually the largest flower. It is very probable that the central flower is in a more favorable position than the laterals for obtaining an adequate supply of water and nutrients. The failure of a flower, while developing, to obtain an adequate supply may result in abnormalities which prevent that flower from

It is becoming more evident that apple varieties quite generally tend to fall into two groups, based upon the similarity of the fruit setting characteristics of the flowers in their clusters. A large number of vigorous flower clusters of certain varieties, following a favorable blooming period, will tend to survive the first drop with two to four fruits to a cluster. In this group are included Baldwin, Ben Davis, Gravenstein, Grimes Golden, Jonathan, Oldenburg, Wagner, Wealthy, Winter Banana, Yellow

blooming period, survive the first drop with a considerably smaller average number of fruits set to a cluster than the varieties in the first group. The varieties included are Arkansas (Mammoth Black Twig), Arkansas Black, Delicious, Nero, Rhode Island Greening, Stayman Winesap and Winesap. Several of these varieties quite regularly bear satisfactory commercial crops. However, occasionally they are not sufficiently fruitful when all external conditions seem favorable. Arkansas in particular rather consistently fails to set sufficient fruits to give a satisfactory crop. The June drop with the varieties Arkansas, Nero, Stayman Winesap and Winesap is very light or almost lacking. Delicious and Rhode Island Greening tend to have a somewhat lighter first drop than the varieties of the Winesap family, with a corresponding greater fall of partially developed fruits later on. The thinning required with the varieties in this group is relatively light and consists largely in the spacing of fruits along the branches.

It has been evident that in clusters of normal vigor of the second group varieties, conditions permitting the setting of a large proportion of the flowers have not been fulfilled. This is indicated in part by a study of the table, which gives the percentage set after the first drop of the central and lateral open pollinated flowers of four varieties of the Winesap family. The blooming season of 1926 was very favorable for cross-pollination. The trees, surrounded by many other varieties, were growing in the orchards at the Ohio Agricultural Experiment Station. All trees, with the exception of Stayman Winesap trees A-4, A-3, I-3, H-2 and H-3, were in vigorous condition. It is evident that although there are four to six times more lateral than central flowers on a tree, the percentage set of lateral flowers of all varieties was low. The central flowers of the vigorous trees of Stayman Winesap (tree E-5 down to C-4-2) and Arkansas Black gave high percentage sets. The central flowers of Winesap and Arkansas also gave higher percentage sets than the laterals. However, in contrast to Stayman Winesap and Arkansas Black, the small differences between the percentage sets of the central and lateral flowers indicate that the greater number of fruits on the Winesap and Arkansas trees were in a lateral position. In the first three varieties, over 88 per cent of the fruit bearing clusters, and in Arkansas 82 per cent, had only one fruit. In the first three varieties, approximately 10 per cent of the fruit bearing clusters had two fruits, while in Arkansas 18 per cent had two fruits.

Delicious and Rhode Island Greening usually set a slightly greater number of fruits to a cluster than these varieties. However, the results indicate that not only these varieties, but also those of the Winesap family mentioned, have a large proportion of the flowers on trees of good vigor which were unable to set fruit no matter how effectively they were pollinated.

(Continued on page 35)

POSITION OF OPEN POLLINATED FRUITS SURVIVING FIRST DROP—WINESAP FAMILY—WOOSTER, OHIO, 1926.

STAYMAN WINESAP.					
Tree number.	Percentage set of flowers.	Central flowers.	Lateral flowers.	Cultural treatment, 1925 and 1926.	
E-5	15.5	41.7	9.4	Sod	10 lb. 1925, 12 lb. 1926, nitrate of soda
E-3	18.7	54.3	10.8	Sod	6 lb. nitrate of soda
C1-11	15.0	61.4	4.6	Cultivation . . .	1/2 lb. nitrate of soda 1/2 lb. 6 oz. sulphate of ammonia
C1-2	15.8	53.5	7.4	Cultivation . . .	No fertilizer
C4-9	12.5	38.8	6.7	Grass mulch . . .	1/3 lb. nitrate of soda 1/2 lb. 6 oz. sulphate of ammonia
C4-2	14.6	50.6	6.6	Grass mulch . . .	No fertilizer
A-4	12.7	34.7	7.2	Sod	2 1/2 lb. nitrate of soda
A-3	6.2	13.2	4.4	Sod	2 1/2 lb. nitrate of soda
I-3	2.8	6.9	1.6	Sod	No fertilizer
H-2	8.2	32.0	1.8	Sod	No fertilizer
H-3	8.6	27.0	3.3	Sod	No fertilizer
ARKANSAS BLACK.					
361	13.0	52.9	4.0	Grass mulch . . .	5 lb. nitrate of soda
282	14.3	49.3	6.7	Grass mulch . . .	5 lb. nitrate of soda
301	10.7	55.0	0.7		
WINESAP					
3-5	5.1	11.9	3.6	Grass mulch . . .	5 lb. nitrate of soda
416	6.8	8.6	6.4	Grass mulch . . .	5 lb. nitrate of soda
ARKANSAS MAMMOTH BLACK TWIG.					
424	11.0	18.6	9.3	Grass mulch . . .	10 lb. 1925, 12 lb. 1926, nit. soda
401	12.4	28.2	8.9	Grass mulch . . .	5 lb. nitrate of soda
262	6.5	0.7	7.8	Grass mulch . . .	5 lb. nitrate of soda

setting fruit no matter how effectively it may be pollinated. In considering effects of the fruit setting factors on different varieties, it has become necessary that we know with each variety the relation of the position of the flower in a cluster to its ability to obtain such an adequate supply of water and nutrients.

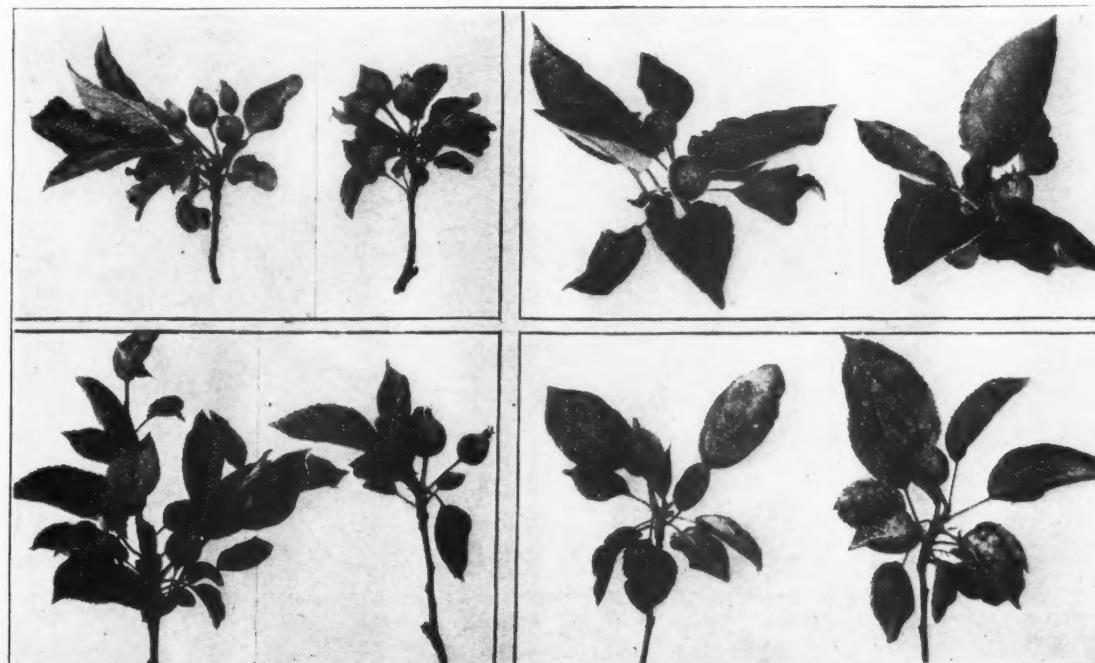
Response to Vigor

Recent studies have indicated that the fruit setting characteristics of varieties are not alike when the trees of such varieties are of the same degree of vigor. The different response to vigor is expressed by the different number of very small fruits surviving the first drop (one to two weeks after petal fall).

Transparent and probably Rome Beauty.

During the course of development of flowers up to full bloom, there is unquestionably a very keen competition between the individual flowers of a cluster for water and nutrients. After the first drop, the presence in a cluster of several fruits developed from lateral flowers indicates that this competition, despite the favorable position of the central flower, was not sufficiently severe to prevent their normal development. In fact, on trees of normal vigor, of these varieties, too many fruits often survive the June drop, necessitating heavy thinning.

The second group consists of varieties, which, following a favorable



Appearance of open pollinated clusters of apples on June 16, 1926, after first drop. Upper left.—First group (Jonathan). Upper right.—Second group (Stayman), central and lateral fruits on left, central fruit on right. Lower left.—Winesap, central fruit on left, central and lateral fruits on right. Lower right.—Arkansas, central fruit on left, lateral fruit on right.

Compatible and Incompatible Graft Unions

By W. L. Howard

University of California

THIS is not an essay on fruit stocks, but rather a discussion of what results may be expected when established trees already in the orchard are grafted over to something else. In other words, it is assumed that the fruit grower is very much interested in knowing the limits of graftage—that is, in knowing how far he may safely go in topworking trees. Most people who know trees at all know better than to try to raise apples and peaches on pears and plums, but the public is not well posted on what are the reasonable limits of graftage. It is therefore the intention of this article to set down our existing knowledge of these things. What is said is based both on observation and experience. The facts I am presenting have been submitted to several nurserymen who have had exceptional opportunities and a vast amount of experience in testing graft unions.

Many Stocks Used in Early Days

The early fruit growers of California did not worry about the rootstocks they used for their trees. In the first place, they knew little or nothing about stocks, and in the second place, they had to take whatever they could get. One of the earliest stocks used for the deciduous fruits was the bitter almond. They also used wild plums. With the coming of transportation facilities with the East, other stocks were added to the list, particularly the Myrobalan or cherry plum. This served as a stock for all kinds of plums and prunes, and occasionally it was used for almonds. St. Julien also was occasionally used.

After orchards had been planted in many places, particularly in the Vacaville, Winters, Suisun and Santa Clara districts, as well as in the foothill regions of Placer and El Dorado counties, the settlers woke up to the fact that they had made many mistakes in the varieties of stone fruits they had used. This led to the wholesale topworking of trees. Thus, the rootstock question became a matter of affinities between species and varieties rather than a question of what would grow in certain soils. There are in some districts orchards and parts of orchards that have been topworked two, three and even four times. This has given us much valuable information relative to good and bad unions. Of course, seedling stocks must be chosen in the first place with a due regard for their ability or "willingness" to take certain buds. Thus, the problem of graft unions cannot be discussed fully without thinking of the seedling stocks as used by the nurseryman as well as the interchange or mixture of varieties by the topworking of established trees in the orchard. In the end, then, the question of stocks must be considered from two standpoints—the nursery and the orchard.

This article is written from the standpoint of affinities between the different species and varieties of fruits in the orchards rather than from what might be expected of stocks as regards their connection with the soil.

What We Know About Affinities Among Deciduous Fruits

Apple.—So far as I know, all varieties of apples, including seedlings, dwarfs, semi-dwarfs and standards, intergraft successfully, and the unions are reasonably secure. Apples will unite with pears and grow for a few years, but the union is never good. The apple can be made to grow on the wild crabapple and even on the hawthorn, but it greatly overgrows the stock, and the union is inclined to be bad. Vigorous growing varieties of apples make an insecure union with the paradise or dwarf apple. The apple has been known to unite with the mountain ash (*Sorbus Americana*), which, of course, is not a true ash but a distant relative of *Pyrus Malus*, the cultivated apple.

The apple will also unite with the quince and may live for two or three years. But to my knowledge, the apple never has been known to make more than a temporary union with entirely unrelated species of trees,

overgrows the stock but does not usually break off badly. If they do not break off or die by the end of the third year, they may live to be old trees. I recently saw an old orchard of 28-year-old trees on Myro pulled

off. The trees are greatly dwarfed. This stock thrives on soils too wet or too heavy for either Mazzard or Mahaleb.

It is possible to graft cherries upon the so-called wild black cherry (*Prunus serotina*), but I know of no successful trees. We now have some sweet cherries budded on mountain choke cherries (*Prunus demissa*), but it is too early yet to say what they will do. Cherry varieties intergraft freely, but I should not expect them to grow upon any other stone fruit, although I have succeeded in getting buds to stick on peach and live for one year. H. J. Baade some time ago reported a cherry tree topworked on sugar prune, growing in Napa, Calif., that "seemed to be doing well."

Peach.—The peach seems always to make a perfect union with all types and varieties of peaches, including *Prunus Davidiana*, the wild peach of China. It unites equally well with the almonds.

We have usually advised against budding peach on apricot, as the trees break off too badly; however, I know of several instances of canning varieties of peaches being topworked on three, four and five-year-old apricots in the orchard with entire success. There are some good examples in the Hemet Valley of Riverside county, California. In our trials, peaches have not done well when budded on Myrobalan seedlings in the nursery. They sometimes stick when grafted on established Myrobalan trees but are considerably dwarfed. I should expect the same result on Japanese plums. The peach does not take well on European plums. This is especially true of the California Blue, which is said to be hard to topwork to anything.

Pear.—Our cultivated pears seem to unite well with all species and varieties of the pear and to make a dependable union. While French seedlings are variable, all seem to make a good union with cultivated varieties. The same is true of Japanese stock. Certain pear varieties make a good union with quince, but others do not. In the latter class are Bartlett and Kieffer, which two varieties constitute perhaps 80 to 90 per cent of all the market pears grown in the United States. To dwarf these varieties, it is necessary to double-work, using Beurre Hardy or Duchesse d'Angouleme as the intermediate. There is an old orchard (40 years or more) in Napa county, California, on Winter Nelis seedlings, which is still doing well. It was planted by Leonard Coates, who is still living.

The pear will unite with the apple, but the grafted or budded nursery trees are likely to die in a year or two. I do not think it would be profitable to try to graft over old apple trees to pears. The grafts will take hold and may bear some fruit, but I have not known such grafts to survive very long, certainly not long enough to be profitable.

Plums and Prunes.—Nearly all types and varieties of plums and prunes make a good union with Myrobalan, which is the chief rootstock for these fruits. Occasionally, there is trouble with the Domestica or European type. The Robe de Sergeant prune, particularly, is a troublemaker; in fact, there is no consistently satisfactory stock for this variety. I have known of a few conspicuous cases in which French prune, nursery budded on Myro, overgrew the stock. The latter seemed atrophied; that is, it made no growth after being budded. The tops grew lustily but died very suddenly in the late summer of their first year. But this was an uncommon case in my experience.

All varieties of the European type of plums intergraft successfully, but the union is inclined to be weak when they are topworked on trees of the Japanese type. The veteran nurseryman, Leonard Coates, reports hav-

(Concluded on page 33)



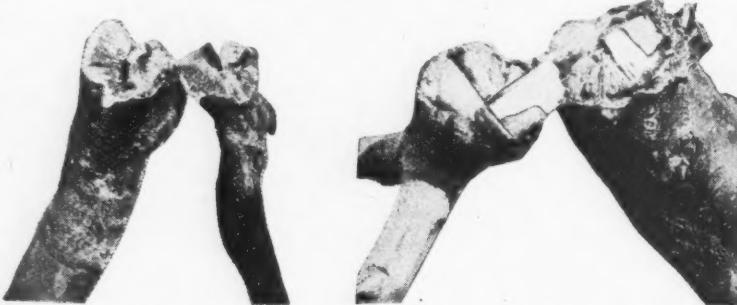
This almond branch on an apricot stock broke off at the union during the first growing season

such as the sycamore, as related in Pliny's "Natural History," or with any other tree outside of its genus.

Almond.—The almond grows well on peach, making a secure union, but it is a total failure on apricot. On Myrobalan, it overgrows the stock and the trees are usually short-lived, but only comparatively few actually break off. I have not seen it tried on plums of the European and Japanese types, but I should expect it to grow fairly well on both; however, I may be mistaken. I should not expect it to grow on any of the cherries,

out because brown rot was bad and the owner wished to grow pears. During the pulling process, eight to 10 per cent of the trees broke off squarely at the union, and yet the orchard had been a good producer. I have not seen apricot grown on either European or Japanese plums, but I see no theoretical reason why it should not do as well on either as on Myro. I should not expect it to grow upon cherry. I understand it makes a promising growth upon Davidiana, although I know of no bearing trees.

Cherry.—Both sweet and sour types



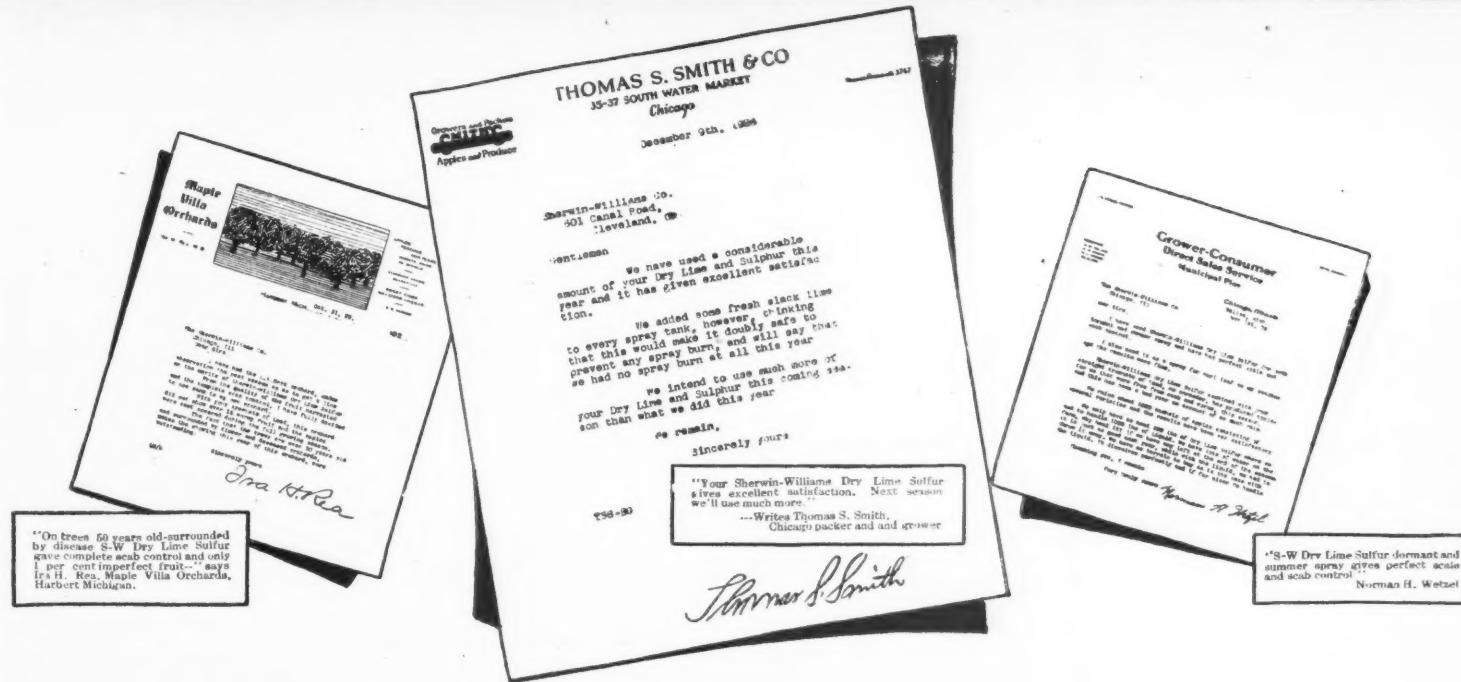
Near views of union of almond on apricot. Breakage occurred during the first growing season

although I have not tried it. The almond is said not to do well on Davidiana stock but thrives on all varieties and types (bitter and sweet) of almonds that form trees.

Apricot.—The apricot does best on some kind of apricot stock. The union is good between all types and varieties so far as I know. The apricot is a complete failure on almond, the union being insecure. It will usually grow on peach. On Myrobalan, it

of cherries unite well with Mazzard, Mahaleb and Morello cherries, but the sweet cherry greatly overgrows the Morello, and slightly overgrows the Mahaleb. On the other hand, Mazzard stock greatly outgrows sour cherry varieties and sprouts badly from the base and from injured roots; also the union is none too secure. Sweet cherries on the so-called Stockton Morello make an ugly, dangerous looking union, but they do not break

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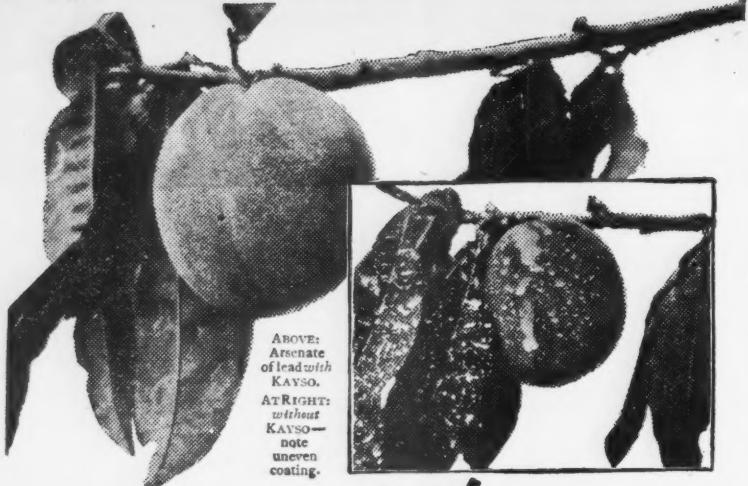
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SPRAY MATERIALS

The Apple Marketing Problem

By C. E. Durst



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The picture shows the disks pulling the soil away from the trees, but the gangs can be reversed to throw it toward the trees.

WITHIN the last few years, it has been brought out clearly by many prominent leaders that large crops of corn, wheat and other general farm crops bring less money to producers than small crops. No one has ever raised the question as to whether or not the same situation applies to fruits, but some figures recently issued by the United States Department of Agriculture indicate that the situation does apply so far as the apple industry is concerned.

In 1926, we had the largest apple crop in history, except that of 1914. The crop amounted to over 246,000,000 bushels. The crop of 1925 amounted to over 172,000,000 bushels. Thus the apple crop of 1926 was about 74,000,000 bushels greater than that of 1925. Yet the Secretary of Agriculture tells us in his annual report that the 1926 apple crop will bring growers about \$37,490,000 less than the crop of 1925 brought them.

These figures indicate that large apple crops bring less money to growers than small apple crops, the same as is the case with general farm crops.

Serious Problems Before Apple Industry

The apple industry faces some rather serious problems at the present time. The production of apples has remained about stationary for the last 30 years, notwithstanding the fact that the population has been increasing rapidly. This means that the consumption of apples per capita has been decreasing. We are eating only about half an apple a day in all forms, including fresh apples, apple pie, apple sauce, vinegar, cider, etc.

The situation for eastern apple growers is even more serious than that for apple growers in general. The great apple industry of Washington, Oregon and California has been built up practically within the last 20 years. These three states now produce about 20 per cent of the apples of the country. It follows that consumption of western apples has rapidly increased. If this be true, the consumption of eastern apples has undergone a very pronounced decrease in consumption. The following table, taken from an address given by the writer before the Illinois State Horticultural Society, shows the per capita production of apples:

Five-Year Periods.	United States.	Barreled Apple		Boxed Apple States.
		Pounds.	Barrels.	
1890-94	95	90	5	5
1895-99	120	115	5	5
1900-04	118	112	6	6
1905-09	84	78	6	6
1910-14	131	127	4	4
1915-19	85	68	17	17
1920-24	79	57	22	22

While this decrease in apple consumption has been taking place, the consumption of other fruits has been increasing rapidly. Oranges, lemons, grapefruit, walnuts, raisins, grapes, bananas, pineapples and cranberries have all shown marked increases in consumption.

Decrease in Consumption Largely Responsible

I think that the unsatisfactory results obtained by apple growers during the past year are explained more largely by the decrease in apple consumption than by any other cause. The apple crop of 1926 was not a large one compared with apple crops of the past when one takes into consideration the rapid increase in population.

If people are not eating apples the way they used to, they apparently do not want apples as badly as they formerly did. They are therefore unwilling to pay the prices they would pay if they wanted apples badly. They would rather have other fruits apparently than pay higher prices for apples. If they wanted apples as much as they formerly wanted them, the large apple crop of 1926 would have been taken by consumers at good prices to the growers.

Other Fruits Merchandised

Why is it that apple consumption has shown a marked decrease, while the consumption of other fruits has shown an increase? I think the matter is explained very largely by the fact that growers of other fruits are pretty thoroughly organized on a merchandising basis, while apple growers are not. A very large proportion of the citrus fruits is controlled by the California Fruit Growers' Exchange and the Florida Citrus Exchange. The Sun Maid Raisin Growers control the major portion of the raisins of the country. The California Prune and Apricot Growers' Association controls most of the prunes. The American Cranberry Exchange markets practically all the cranberries of the country. The United Fruit Company, a private organization, has absolute control of the growing and marketing of bananas. The pineapple industry of Hawaii is well organized through the canners, who control the processing and marketing of the crop. The English walnuts are practically all marketed by the California Walnut Growers' Exchange.

Complete, Well-Balanced Program Being Used

All of these organizations are applying modern methods of merchandising and handling of their products. Uniform production methods as to variety and culture are being employed. The companies are constantly on the lookout for new by-products, and some of them have increased consumption very materially through the manufacture of new by-products. The products are standardized, labeled and branded upon a uniform, dependable basis. Advertising is being used to arouse interest in the product. The output is being distributed among consumers in accordance with demand, both with respect to time and place. Lastly, expert salesmanship methods are being applied in marketing the crop.

In other words, all of these organizations are employing modern methods of merchandising in which each important factor receives its due share of attention. All of them are established on a permanent basis, and they are therefore able to follow out a consecutive, consistent policy from a long-time standpoint, the same as any bank or business organization can do. How can the disorganized apple industry hope to hold its own in competition with the other highly organized branches of the fruit industry? It cannot do so, and the only sensible thing for apple growers to do is to admit it and begin to shape their industry accordingly.

Many Faulty Suggestions Made

From time to time many suggestions have been made for solving the apple marketing problem. A good crop of such suggestions usually comes at a time when the situation is acute and when many growers are inclined toward support of any plan offered for improving the situation.

We have heard many persons claim for years that better and more economical production methods would solve the problem. Many apple growers have developed the best and most economical methods of production found anywhere in the field of agriculture, and still the problem of marketing is before them. Attention to production alone has failed to solve the problem, and it never will solve it.

Some persons, particularly dealers and speculators, have claimed that the development of better grading and packing methods by the growers would solve the entire problem. They take the view that well graded and well packed fruit will sell for remunerative prices, but many of our best growers have been following this plan and have convinced themselves that standardization alone will not solve the problem.

The suggestion has been made many times that advertising will put the apple industry back on its feet. Advertising has, of course, done great

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things when properly employed. The growers of many fruits and of many other products have increased consumption of their products materially by advertising, but in every case of this kind the advertising has been part of a well co-ordinated program in which all the important factors of merchandising have received due consideration. People who know the most about advertising are the last ones to support a campaign for increased consumption of any product which is based on advertising alone. There are not many ways in which money can be wasted faster, in my opinion, than by dumping it into a campaign in which the advertising is not properly co-ordinated with the other important factors of merchandising.

Neither can good distribution methods alone or expert salesmanship methods alone solve the apple marketing problem. Attention to these factors alone will fail to give satisfactory results if attention is not given also to production, standardization and advertising.

Complete, Well-Balanced Program Needed

Only a complete and well-balanced program can bring the results that apple growers want and deserve. This is the kind of a program that growers of many other fruits have used in solving their problems, and it is the kind of a program that is being followed everywhere in successful business and industry.

The development of such a program must begin at home in the local communities. Growers who live near each other must organize local marketing associations for grading, handling and standardizing of their products. The local associations of each producing district must be federated so that standardization can be worked out on a large scale and in order that better distribution and salesmanship methods may be employed. Finally, the different apple sections of the country must develop co-operation between each other so that national distribution and advertising can be most effectively worked out.

It is going to be a difficult thing to organize the apple industry on an effective merchandising basis because the acreage is spread out over so much territory, but until the industry is organized on such a basis, I do not see how the apple growers are going to be able to improve their situation materially. The thing for growers to do is to begin at the bottom and organize themselves by communities. This will gradually lead to a clear understanding on the part of growers in general of the principles involved and of the requirements of the situation. The problem will work itself out satisfactorily over a period of years, in my opinion, if growers approach it in this way.

Early Overhaul Saves Later Sprayer Troubles

DEFFECTIVE spray machines cause big losses of time and materials to growers each year. Low pressure, due to worn pumps or to faulty operation of engines, and delays while repairs are being made, can be largely avoided by thoroughly overhauling the sprayer during the winter months, suggests A. Freeman Mason, extension specialist in fruit growing, New Jersey College of Agriculture. The grower or an experienced mechanic should make a careful examination of the machine and repair or replace all worn parts, and give the rig a general cleaning and overhauling.

The engine valves should be ground, new piston rings installed if compression is weak, bearings adjusted, batteries, coils, spark-plugs and wires tested, and dirt and grease removed with gasoline or kerosene.

The pump usually will need most attention. Place new packing in the boxes, replace plunger washers on the pistons, or replace pistons if the old ones are worn or scored. Valve seats should be turned over or replaced. If balls are worn down or scored, they should be removed. Clean and grease

all moving parts on the pressure regulator, placing new packing in the stuffing box at the top of the stem and a new rubber diaphragm at the base if this type of regulator is used. Bearings on the pump and agitator should be examined and replaced or tightened as needed, new packing placed in the boxes, and any broken paddles replaced.

All hose should be tested at a somewhat higher pressure than is to be used in the field. A new brass or copper strainer should go on the suction hose and on the strainer box in the filling vent. Examine hose connections and repair leaky ones; clean guns and nozzles; and install new disks. Paint the entire sprayer with a high grade paint.

An ample supply of repair parts should be on hand for use in case of emergencies. Most needed of these are valve seats, packing, plunger washers, new pump pistons, hose connection clamps and bolts, spark-plugs and coils. With these precautions taken, the grower may face the spraying season with but little apprehension of a break down at a critical time during the growing season.

CO-OPERATIVE marketing does not need to be over-sold. It can stand upon its own merits, and when it is considered purely on its own merits, it will give 100 per cent satisfaction to whoever uses it. He is a foolish man indeed who will buy a dozen oysters—and then complain because he

doesn't find in them a pearl. He is a silly dreamer who will buy a new Ford car—and then kick because it doesn't fly. And he is just as foolish, who will join a co-operative association—and expect it to bring him fantastic prices for his wheat. Co-operation does not need to be over-sold. It can stand upon its own merits. And its merits are these: It will bring to the individual, year in and year out, a better price than if the individual dumped his wheat. It will raise the general price level. It will eventually make the farmer economically independent, because it will put into his hands the machinery for merchandising his own products for what they are really worth.—*Colorado Wheat Grower*.

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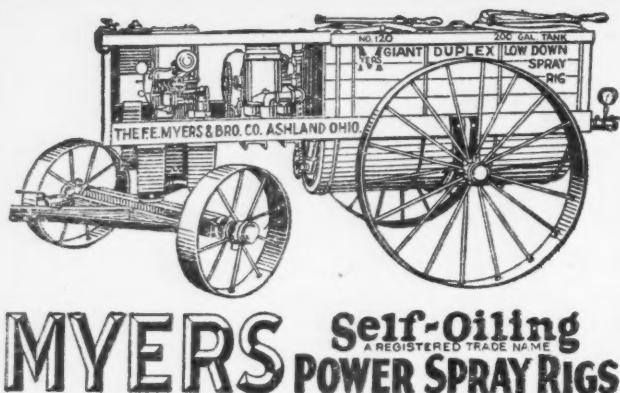
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Recommendations for Codling Moth Control



MYERS Self-Oiling POWER SPRAY RIGS

MYERS Self-Oiling Power Spray Pumps and complete Power Spray Rigs furnish you the maximum spraying efficiency at the lowest possible cost.

These spraying machines have been developed after years of exhaustive research by expert engineers with a first-hand knowledge of spraying requirements. Myers Self-Oiling Power Pumps and easy-operating cog-gear Hand Sprays are now used by thousands of progressive fruit growers and agriculturists—the world over.

Myers Self-Oiling Power Spray Rigs, with their positive self-lubrication, enclosed working parts, automatic regulation and other exclusive features give you a new standard of power spraying efficiency.

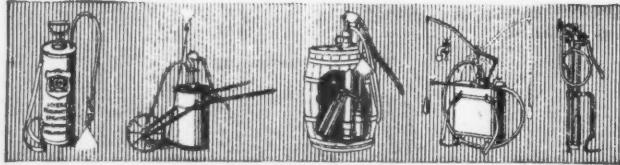
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Annual Cover Crops

SOME cover crop experiments have been conducted in British Columbia which are yielding valuable results, not only for that section but for many fruit sections of the United States.

Each year sowings of hairy vetch, spring vetch, buckwheat, fall wheat, fall rye, barley and rape have been made on August 1 and September 1. Records have been taken of the amount of growth made before winter began. All of the crops have been turned under in the spring, and the orchards have been kept clean cultivated in the summer.

The results to date indicate that annual cover cropping is not as satisfactory as the growing of continuous cover crops where there is sufficient moisture to permit the growth of the latter. However, the annual cover crops have been found helpful in maintaining the fertility and humus content of the soil and in affording protection to the roots during the winter.

Hairy vetch is probably the most serviceable of the crops tested. It has given good results when sown about August 1 and disked into the soil during the following May or early June. When fall grains are used, they may be sown as late as September 1. Considerable expense is involved in the growing of annual cover crops, but their use is recommended where there is insufficient water to make the growing of permanent cover crops possible.

Bees Give Good Results in McClay Orchard

A RECENT issue of the American Bee Journal contains an article by G. H. Hale on "Wedding Bee and Blossoms in 1200 Acres of Apples." The story gives an account of the McClay orchards at Hillview, Ill.

Because of light sets of fruit in past years, the owner several years ago sought the advice of W. P. Flint, state entomologist of Illinois. Dr. Flint advised the use of bees. S. J. Kennedy of Nebraska was employed as manager of this phase of the business. One colony of bees was set at every twelfth tree in every sixth row, the locations being alternated in order to secure the most uniform distribution.

The results from the first season's work were encouraging. In spite of a late spring, a frost and a severe hail-storm, a crop estimated at 65,000 barrels set on the trees. The best previous crop had been 51,000 barrels.

Since 1910, the orchard has not borne a good crop of Ganos. The best crop produced was at the rate of two and one-half barrels per tree in 1923. In the first year during which bees were employed, a crop of five and one-half barrels per tree was obtained. The improved results are attributed largely to the bees.

Care is taken in the McClay orchards to avoid spraying while the trees are in bloom. Sod culture is practiced, and there is little to feed the bees after the trees have bloomed. Last year the bees were moved out of the orchard at the close of the blooming season and placed at the foot of the hills, from which place they had ready access to numerous wild flowering plants growing in the Illinois river bottoms.

THE FRUIT production of Florida for the last three years was as follows:

FRUIT PRODUCTION OF FLORIDA FOR LAST THREE YEARS (000 omitted)

Fruits	1924	1925	1926
Grapefruit, crates....	8,200	6,500	6,000
Oranges*, crates.....	11,600	8,200	9,000
Peaches, bushels.....	127	115	125
Pears, bushels.....	55	54	66
Pineapples, boxes....	90	42	22
Pecans, pounds.....	910	1,340	1,060
Strawberries, quarts. 8,676	8,056	5,513	

*Shipped oranges only are included.

BECAUSE of the increased importance of the codling moth and the alarming conditions prevailing in many orchard districts of Illinois and Indiana, a conference held at Danville, Ill., November 18, 1926, made definite recommendations for the handling of the situation. These were drawn up by W. P. Flint and S. C. Chandler, entomologists of the Illinois Natural History Survey, J. J. Davis, entomologist of the Purdue (Indiana) Agricultural Experiment Station and B. A. Porter of the United States Bureau of Entomology, co-operating. These recommendations have also been approved by the horticultural departments of the Illinois and Indiana agricultural experiment stations.

Experiments to date indicate arsenate of lead to be the most satisfactory insecticide of all that have been tested. For winter varieties of apples all sprays against the first brood, and the first spray for the second brood, should contain not less than one and one-half and preferably two pounds to 50 gallons of spray. Later sprays should contain one pound to 50 gallons, except in cases where the codling moth situation is severe, when heavier dosages of lead may be used and the fruit wiped or otherwise treated before marketing, if necessary, to remove excessive residues. If it is necessary to spray summer or fall varieties a month or six weeks before picking, all spray residues should be removed by wiping or otherwise. The regular spray schedule recommended by the experiment stations of the two states should be followed. Precautions should be taken to secure extra thoroughness in the application of all sprays, especially for the first brood. The calyx spray should be applied within five days after petal fall.

Dust applications are not recommended because experiments and observations to date show that they are not as effective against the codling moth under Illinois and Indiana conditions as are the liquid sprays. Experimental work with the oil sprays, to date, do not warrant making any recommendations for Illinois and Indiana.

Under favorable weather conditions for the codling moth, such as occurred in the fall of 1925 and spring and summer of 1926, and when the insect occurs in such abundance as during the past season, the sprays alone are not usually sufficient to produce fruit free from worms. The following additional control recommendations are therefore recommended:

1. *Banding Trees.*—Tar or building paper is recommended, using strips six inches wide. Before placing the bands on the trunk, the trunk and larger branches of the tree should be scraped to remove the scaly bark. The bands should be in place before the first worms have matured, usually not later than June 1 for southern parts of the state to June 15 for the northern sections. These bands should be continued throughout the season and examined for worms and cocoons every 10 days until September. Every worm should be removed and destroyed. A wire brush is useful for destroying the worms on the trunk beneath the band. The bands should be left in place until after picking, and the worms under them should be killed later in the fall or early winter to reduce the infestation for the following year.

2. *Rubbish Under Trees.*—Throughout the year, the orchard should be kept free from prunings, dropped apples, cornstalks and other rubbish which may act as shelter or protection to the worms. Any rubbish which is in the orchard during the winter months should be carefully removed and destroyed before May 1.

3. *Thinning.*—Where it is practical to thin fruit, care should be taken to pick and destroy all wormy fruit. This is especially important for the first brood of worms. At time of picking, all culs should be destroyed by

burning, by burying at least a foot below the surface, or by other efficient means.

4. *Packing Sheds.*—Packing sheds and their contents are oftentimes sources of heavy infestations. In the fall and during the winter the worms issuing from the apples seek places of shelter, such as cracks and crevices in packing sheds, in baskets, boxes, or other containers. Whenever packing sheds are so constructed that they may be thoroughly screened to prevent issuing moths from escaping in the spring, this method may be used. Containers in packing sheds or those which may contain worms, should be freed of infestation or left undisturbed in moth-tight sheds. The containers may be freed of infestation by keeping them in a room which is kept at a temperature of 130 degrees Fahrenheit for six hours. Another method would be to store the containers in a room which can be tightly closed or screened to prevent the escape of issuing moths.

The present situation makes it urgent that every orchardist use all possible means to check the increase and destructiveness of the codling moth.

Chemical Analysis of Soil Has Only Limited Usefulness

CHEMICAL ANALYSIS alone is of very little value in determining the fertility needs of the soil.

It is a popular belief that a chemical analysis of the soil will solve the problems of soil management. This overrating of the value of the chemical soil analysis is due largely to the idea that soil fertility is measured by the supply of mineral plant food in the soil.

A fertile soil results from a number of factors, one of which is the supply of mineral elements of plant food. A chemical analysis of the soil will show the total supply of some of these elements but not the amount available for plant use. Unsatisfactory as present methods may be, chemical analysis remains of fundamental importance in soil investigations. However, to be of greatest value in working out a system of soil management, chemical analysis requires a detailed survey of the area, together with greenhouse and field tests on the particular soil.

Even though soil management were a simple matter of chemical analysis, soil samples could not be analyzed for every person who desired to send to the experiment station. The cost would be prohibitive. Moreover, neither the state nor the federal government has made financial arrangements for such analysis. Usually such samples are not representative of the area and the analysis would be of little value.—F. B. Smith, Colorado Agricultural College.

Fresh Straw Stunts Plant Growth

FRESH STRAW plowed under sometimes stunts the growth of the following crop, according to soil specialists of the New Jersey Agricultural Experiment Station. The straw acts as a medium for certain kinds of bacteria which multiply rapidly and which feed on the nitrogen that would ordinarily go to the crop. This explanation is borne out by the fact that when nitrogen is added with the straw, the harmful effects are prevented.

In very sandy soils, injury appears before a shortage of nitrogen can make itself felt. Apparently, the straw also introduces poisons which affect the tender seedlings.

The soil specialists of the station are now endeavoring to find methods of treating the straw so that both forms of injury will be prevented.

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Ethylene Gas Useful in Ripening Fruits

NEW METHODS of growing and handling fruits are often adopted slowly and with great reserve on the part of growers. An exception, however, occurred in the case of the use of ethylene gas for ripening fruits. This new method has proved so satisfactory that it has been very generally accepted in a short time. It has been used successfully for treating oranges and grapefruit for some time.

Formerly, oranges and grapefruit were exposed to gases generated from burning kerosene. Sometimes good results were obtained and sometimes they were not so good. It now appears that ethylene gas was the factor which brought about the desired results and that when poor results were obtained the generation of ethylene gas was deficient or lacking.

The use of ethylene gas for ripening fruits was developed by Dr. R. B. Harvey of the University of Minnesota. It consists merely in exposing the products to dilute ethylene gas, which has the effect of destroying the chlorophyll or green coloring matter. The material has been found particularly serviceable for treating oranges and grapefruit, which very commonly have some green rind when picked. Exposure to ethylene gas destroys the green substance and leaves the fruits uniformly yellow all over, thus improving their marketability.

Ethylene gas has been found particularly valuable for ripening tomatoes. Green tomatoes exposed to ethylene gas will ripen quite readily and will quickly develop the ripe red color, which seems to be due to a decomposition process which follows the destruction of the chlorophyll. The sugar content of tomatoes ripened in this way is said to be increased, and the fruit is claimed by some to be even superior to that ripened on the vines. The gas has also proved useful in ripening celery, bananas, pears and honeydew melons, and it may have value also for ripening many other fruits and vegetables.

Ethylene gas can be obtained in pressure tanks holding 25 cubic feet or more. It is the same gas which is used for anesthetic purposes in hospitals and it can usually be obtained from hospital supply houses at moderate prices. The tanks are equipped with pressure gauges, and by following directions one can liberate with accuracy any quantity of gas desired.

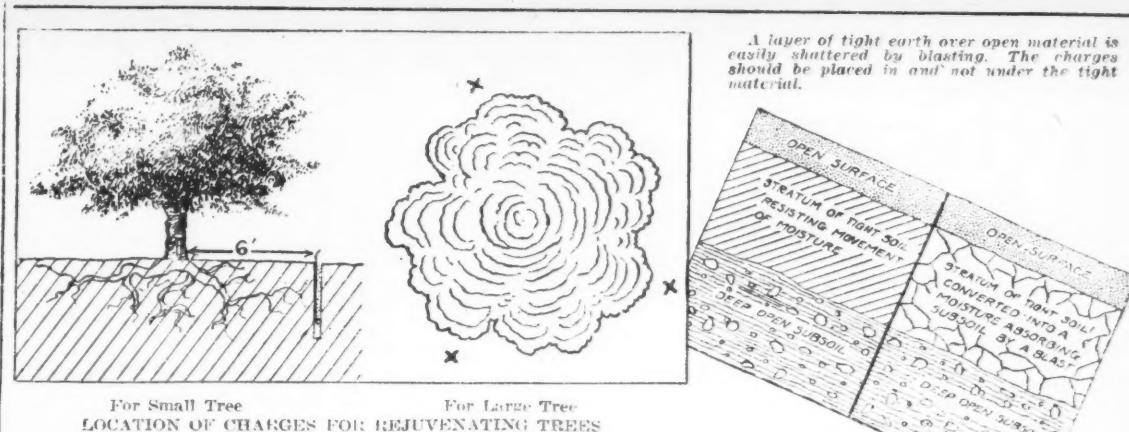
In treating the products, they should be placed in an air-tight chamber. It seems that about one cubic foot of gas to 1000 cubic feet of air space is about the right dilution for all products. The time of exposure varies somewhat. Bananas will ripen in from 42 to 48 hours. Celery requires from three to 10 days, depending on the variety. The temperature of the room should be about 65 degrees. The humidity should be rather high to prevent wilting of the product. If the gas escapes through cracks, more should be applied each evening.

There is some danger of igniting the gas as it comes from the tank, but in the diluted condition there is no danger. The gas does not seem to have any poisonous effect whatever, and persons can work without harm in a room containing fruit under treatment. The gas is colorless and is practically without odor.

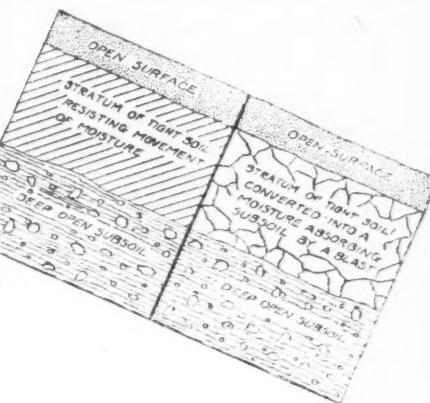
Use Good Strain of Inoculating Bacteria

IN TESTS conducted by government experts, it has been determined that the legume bacteria which appropriate the free nitrogen of the soil air may be divided into seven groups, as follows: the alfalfa bacteria, the red clover bacteria, the vetch bacteria, the navy bean bacteria, the lupine bacteria, the cowpea bacteria and the soybean bacteria.

Before a legume can obtain nitro-



A layer of tight earth over open material is easily shattered by blasting. The charges should be placed in and not under the tight material.



Plow sole or shallow hardpan is most easily broken by plowing to greater depths. This may be done in connection with blasting for pulverizing deeper hardpan.

Write today for the "Farmers' Handbook of Explosives" —100 pages of information about ditching with dynamite and other uses of explosives.



gen from the air, the bacteria which serve the group of plants to which it belongs must be present. It is the bacteria that take the nitrogen from the air and not the legume.

In order to enable legumes to take nitrogen from the air on land which has not been planted to the legume in question for a long period, it is necessary to introduce the proper bacteria into the soil. This is done by introducing soil from a field which has grown the legume and in which the legume roots are found to be well inoculated, or by applying laboratory cultures to the seed or soil before planting the legume.

In tests conducted by the govern-

strains of a given kind of bacteria have different efficiencies in collecting nitrogen from the air. It is important, therefore, that growers of legumes inoculate their plants not only with the proper kind of bacteria but that they use a highly efficient strain of the bacterium in question.

Michigan Spring Meetings

THE SPRING meeting of the Michigan State Horticultural Society will be held in two places this year. A special meeting will be held at Paw Paw in the grape district on March 1. Marketing grapes will be discussed by William H. Esslinger. The dead arm disease of grapes will be covered

in a talk by C. W. Bennett. Dr. N. L. Partridge of the experiment station will give a talk on factors influencing the sugar content of grapes. A general discussion of dusting of grapes will be conducted at the close of the afternoon session.

The principal session will be held at South Haven in the high school auditorium on March 2 and 3. Subjects of importance to fruit growers will be discussed by Don Hootman, Edwin Ewell, V. R. Gardner, E. C. Mandenberg, C. L. Burkholder, Minard Farley, Raymond C. Hitchings, W. C. Dutton, O. L. Gregg, F. H. Simpson and others.

A banquet will be held in the armory on the evening of March 2.

Deep-plowing with DYNAMITE !

a new treatment for failing orchards

ARE profits from your orchard limited because the trees do not receive sufficient nourishment from the soil to ensure vigorous growth and larger and better fruit? Are you cultivating only the top soil of your orchard?

Deep-plowing implements scratch the surface. But **deep-plowing with dynamite** shatters hardpan and mellows the soil, creates a reservoir for water storage, aerates or ventilates the soil and extends the feeding ground for the roots.

Deep-plowing with dynamite is a simple, quick and effective treatment of orchards which are not yielding profitable crops. Small charges of dynamite are exploded at the proper depth and distance in the compact subsoil. The explosion does all its work *in the soil*,—no upheaval of the surface—no disturbance of trees—just a thorough breaking up of hardpan. This remedy has been used extensively with most satisfactory results. If your orchard isn't yielding the quality and quantity of fruit required, try the deep-plowing with dynamite treatment.

Farmers' Handbook tells about tree-planting and deep-plowing with dynamite, as well as many other profitable uses of explosives. Write for a FREE copy today.

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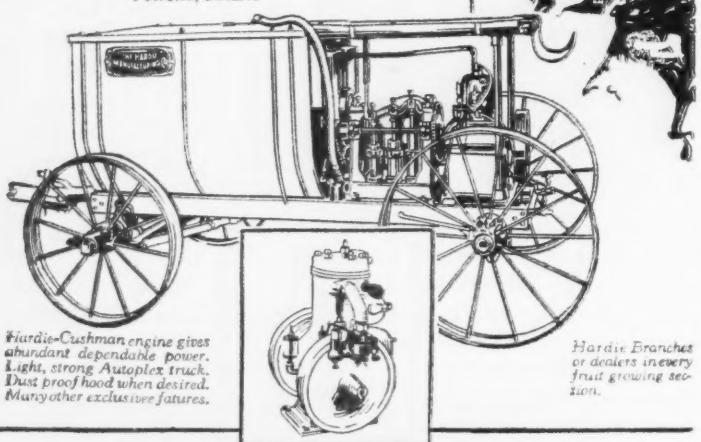
Smooth flowing POWER Lasting Strength

THE new No. 12 Mogul is Hardie's answer to the demand from large growers for a sprayer giving more capacity, higher pressure and with lighter weight. This big Mogul with a discharge capacity of 15 gallons per minute, and with 200-gallon tank mounted on the truck weighs only 1800 pounds. And it includes the numerous new Hardie pump, engine, and truck features which today embody the greatest improvements that have ever been made in the industry.

Absolute, positive self-oiling has been accomplished without enclosing the pump or sacrificing the accessibility of any part. The spraying solution cannot mingle with the oil. Plungers that do not leak; die cast removable bearings; absolutely tight valves that are easily removed; silent chain drive; Hardie Cushman engine; Autoplex truck, all make the Hardie the outstanding sprayer unit today. 20 sizes and models. From \$5.00 to \$1000. Pressure up to 650 pounds.

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Branches at: Portland, Oregon; Los Angeles; Kansas City;
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Hardie-Cushman engine gives abundant dependable power. Light, strong Autoplex truck. Dust proof hood when desired. Many other exclusive features.

DEPENDABLE HARDIE SPRAYERS

Hairy Vetch Valuable as Permanent Crop

THE BRITISH Columbia Agricultural Experiment Station has found that hairy vetch is valuable as a permanent cover crop in orchards located in the British Columbia dry belt. Excellent results have been obtained by sowing the vetch with a drill about August 1. Good stands have been obtained from the use of only 25 pounds of seed to the acre. In order to distribute the seed evenly, each alternate hole of the drill was blocked with a piece of cardboard and the drill holes were closed as far as possible without crushing the seed.

Hairy vetch dies after producing seed, and re-seeding must be effected by disk the growth into the soil early in August or as soon as a fair proportion of the seed is ripe. In some orchards in which the trees were so heavily loaded with fruit that fall disk the was impracticable, good results followed the use of a disk early in the spring. If such disk the is done early enough, the vetch usually flowers in time to set seed the same year. One important advantage of vetch as a cover crop is the fact that in case of serious water short-

age, the crop can be destroyed and the land reduced to a state of clean cultivation by thorough disk the. This method may also be employed in the control of rodents.

In orchards in which hairy vetch has been used as a cover crop, the trees have made a vigorous growth and have borne excellent crops of fruit. The texture of the soil has been greatly improved and a good supply of humus and nitrogen has been provided. The cost of operation has been reduced to a low figure, and slightly less water is required with vetch than with alfalfa. Hairy vetch seems to be well adapted for use as a cover crop in the irrigated sections of British Columbia.

THOUSANDS of wild water fowl have been dying in western sections due to vanishing water areas, according to the United States Biological Survey. Irrigation and a deficiency in rainfall for several years are responsible. With the return of rainy years, it is expected that some of these areas will again be flooded, but the original condition will never be completely restored, since some of the areas have been drained and converted into ranches.



The Editor's Mail Box

(Editor's Note: This department will include each month copies of letters received at the office and our answers to the same, if any. The department is intended for correspondence relating not alone to questions of production and marketing but for any matters relating to the fruit industry in which growers are interested. We cannot publish all letters received, but will select each month those which in our opinion will meet with the most general interest. Preference will be given to letters not over 150 words in length. Only letters that contain the full name and address of the writer will be printed. No attention will be paid to letters signed with the initials only.)

Winter Killing of Peach Buds

Editor, AMERICAN FRUIT GROWER MAGAZINE: Can you give me any information regarding the temperature at which peach buds are killed? What is the lowest temperature the buds will stand in the winter?—M. D. S., Illinois.

ANSWER: There is no definite temperature at which killing of peach buds takes place. Under some conditions peach buds have been known to withstand temperatures 10 to 15 degrees below zero. In other cases the buds have been killed by considerably higher temperatures.

Winter killing seems to be brought about not by one factor alone but by a combination of factors. The most likely cause of killing is withdrawal of water from the cells. Many theories have been advanced, but this one seems the most plausible. As the temperature reaches the killing point, ice begins to form in the intercellular spaces, and water is drawn from the cells. When withdrawal reaches a certain point, death of the tissues takes place.

The ease with which water can be withdrawn from the cells depends on a number of factors. If the trees are in thoroughly dormant condition, the cell sap will be more concentrated and withdrawal of water will take place with difficulty. The condition of the trees with reference to the resting period also has a considerable bearing on winter killing.

In northern states, it is considered good practice to adopt cultural methods that will ripen up the wood of the trees early in the fall. However, in southern Missouri and similar latitudes some authorities recommend that growth be encouraged until late in the fall so that the resting period will be delayed. There is less winter killing, according to these authorities, when the trees are handled in this way in that section.

Lime-Sulphur and Summer Injury

Editor, AMERICAN FRUIT GROWER MAGAZINE: At different times I have heard that lime-sulphur used in the summer has a tendency to burn and dwarf the apples and that many growers are using Bordeaux mixture instead.

Will you kindly advise me if Bordeaux mixture can take the place of lime-sulphur solution? In other words, can Bordeaux mixture be used to advantage starting with the calyx spray and continuing its use thereafter?—W. P. G., Missouri.

ANSWER: Lime-sulphur is likely to burn and dwarf apples when it is sprayed on the fruit in hot weather. However, when the material is applied in cool weather, there is little or no danger of damaging the fruit.

So far as Bordeaux mixture is concerned, this has a tendency to russet the fruit, especially of certain varieties, when it is applied while the fruit is quite small. After the fruit has reached a little size, and after the skin has become somewhat tough, there is no danger of russetting the apples.

With these two things in mind, many growers are using both lime-sulphur and Bordeaux mixture for apples. The lime-sulphur is used early in the season while the apples are small and the Bordeaux mixture is used later in the season after the apples have reached the size of small walnuts. By this means, both the early russetting of the fruits by Bordeaux and the hot weather damage from lime-sulphur are avoided. The

Bordeaux mixture is a somewhat more effective fungicide than the lime-sulphur, and many growers use it on apples in preference to lime-sulphur when there is no danger of russetting the fruit.

I do not believe Bordeaux mixture should be used exclusively for apples. I think it can take the place of lime-sulphur during the summer, but I think that in your section lime-sulphur should be used for the first two or three sprays while the apples are small.

Gassing Gophers

Editor, AMERICAN FRUIT GROWER MAGAZINE: We have a very bad infestation of gophers. They are destroying everything we have. Will you please give me the name of the gas that is used for destroying this pest in orchards?—J. O. W., Missouri.

ANSWER: You can kill ground squirrels and gophers by placing one ounce of calcium cyanide crystals in the small burrows and two ounces in the large burrows. It is not necessary to seal the entrance to the burrows, as the fumes are heavier than air and settle to the low places.

You can also buy blower dusters which will force finely ground cyanide dust into the burrows.

Application of either the crystals or the dust may be made at any time during the day.

One should be very careful in using the cyanide, as it is quite poisonous. Take care not to breathe the dust. Also keep the material away from children, pet animals and livestock. If your local druggist or insecticide dealer does not keep calcium cyanide, you can purchase it from the American Cyanamid Company, 511 Fifth Avenue, New York, N. Y.

Use of Nitrate of Soda

Editor, AMERICAN FRUIT GROWER MAGAZINE: Will you please tell me how to use nitrate of soda on young apple trees in the spring to stimulate active growth? Please tell me how and when to apply it?—W. T. W., Illinois.

ANSWER: Nitrate of soda is very easy to use. With reference to amount, you should use about one-fourth pound for each year of age of the trees on the average. Of course, this amount should be taken only as a guide. Trees which are growing quite vigorously may not need any nitrate at all, whereas slow growing trees may need more. The nitrate should be thoroughly pulverized and it should then be spread around the trees under the branches. There is no need of applying it close to the trunks. The feeding roots are located out under the branches of the trees.

Double-Worked Grimes

Editor, AMERICAN FRUIT GROWER MAGAZINE: Northern Spy roots are said to be resistant to certain kinds of root rot, and it is claimed that trees propagated on such roots will not succumb to these diseases.

Will you kindly tell me how double-worked Grimes Golden trees can be propagated and where they can be purchased?—J. M. B., Virginia.

ANSWER: It is true, as you state, that Grimes Golden apples are more or less susceptible to root rot. However, if the variety is grafted on a resistant stock so that the Grimes Golden wood is held at considerable distance from the ground, damage from root rot is avoided. The Northern Spy is generally recognized as a very good stock upon which to work the Grimes.

In propagating such trees, Northern Spy scions are grafted on ordinary seedling roots. If budding is used, Northern Spy buds are budded onto the seedlings and the tops of the seedlings are later removed.

Some nurserymen plant the grafts deeper than usual with the object of encouraging roots to form above the graft. This gives a Northern Spy tree on its own roots. The seedling root can be removed if desired when the tree is taken up previous to being

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planted in the orchard. However, if this is not done, the seedling root often dies in time, being superseded by the Northern Spy root.

The Grimes Golden scions are later grafted onto the Northern Spy about 12 to 18 inches above the ground. Root rot rarely goes this high, and thus the Grimes wood is protected from root rot. At the same time, the graft is below the framework, so that the whole operation can be performed as a result of one graft.

Some nurserymen are now handling double-worked Grimes trees. I do not have the names of these nurserymen, but if you will write to a number of nurserymen and ask them if they can supply you with double-worked Grimes trees, I am sure you can get the desired information. Such trees will no doubt cost more than ordinary trees, but they will be worth a reasonable premium.

Treatment for Blister Canker

Editor, AMERICAN FRUIT GROWER MAGAZINE: Will you please tell me what I can do for blister canker on apples?

Also please advise me if I can use calcium arsenate, which is used for the boll weevil on apple trees.—L. L. North Carolina.

Answer: Blister canker is a difficult disease to control. It usually starts quite a while before it is noticed. Quite often the trees are pretty badly infected before the cankers are apparent to the ordinary observer.

If your trees are not too badly infected, you can help them by cutting out the cankers. Trees which are very badly infected should be removed. Branches which are badly infected should be cut off. All other cankers should be carefully trimmed out. The infected tissue usually extends for quite a distance below the canker and you should cut away the tissue until no discolored bark or sap wood is apparent.

You will find a farrier's knife, very convenient for this work. Trim the cankers out carefully, leaving the cut surface as smooth as possible.

Immediately after the canker is trimmed out, apply shellac to the entire cut surface. After it has dried for a few minutes, apply a coating of coal tar.

The tools used in trimming out the cankers should be sterilized by sponging them with mercuric chloride or copper sulphate solution after each tree is treated. This will prevent infection of healthy tissue.

It is a good thing to follow up the original treatment with careful inspection of the trees a couple of times a year. The areas around the old cankers should be particularly noticed. If the cankers are enlarging, it is evidence that the diseased tissue was not entirely removed. In such cases the diseased areas should be cut out and treated as above described.

With reference to the use of calcium arsenate on apple trees, I regret to advise that you cannot use this. This material will damage the foliage and fruit of apple trees. I would recommend the use of arsenate of lead for apples.

Evergreens from Cuttings

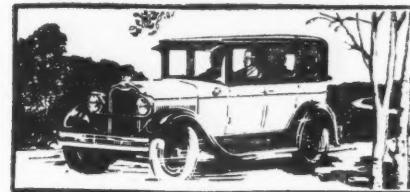
Editor, AMERICAN FRUIT GROWER MAGAZINE: Could you tell me if I can start evergreen trees from slips? If I can do so, kindly advise me how to do it.—A. G. R., Ohio.

Answer: You can propagate quite a number of the evergreens from cuttings, but these must be handled very carefully. Usually, it is best to take cuttings of fairly well matured wood in August. Cuttings are taken from wood of the season's growth and are cut into pieces four or five inches long. These should be plunged in clean sand and kept fairly moist and shaded.

Such cuttings take root very slowly and it is usually necessary to give them careful attention for about a year before they will take root and grow. It is usually a pretty good task to attend to such cuttings when one is not fixed for it. Nurserymen

“Compare it with the finest cars of Europe and America—and you will discover that the only difference is one of wheel-base and price” . . .

\$1095



Of all the changes which have occurred in the automotive industry during recent years, none is of greater significance than the trend of public opinion toward the Oakland Six. Each year more buyers have seen that no other car of comparable price provided such masterly engineering, such scrupulously fine construction, and such superlative performance results!

That the Greater Oakland Six is the Oakland triumph of all, is clearly revealed by the spectacular popularity it has enjoyed from the day of its introduction. It offered such valued features as commandingly beautiful bodies by Fisher, the widely imitated Har-

monic Balancer, four-wheel brakes, air cleaner, oil filter. It introduced the now famous Rubber-Silenced Chassis and foot controlled tilting beam head-lights. And it took all America by storm!

If you know the many benefits and advantages attached to the ownership of a truly fine car—come in and see the Greater Oakland Six. Compare it with the finest cars of Europe and America—and you will discover that the only difference is one of wheel-base—and price!

OAKLAND MOTOR CAR COMPANY,
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Oakland Six, \$1025 to \$1295. Bodies by Fisher. All prices at factory. Easy to pay on the General Motors Time Payment Plan.

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who grow evergreen plants usually have hot-beds and greenhouses which are specially adapted for such purposes.

Protect Citrus Trees from Shot-Hole Borers

“BE ON the lookout for shot-hole borers and treat infested trees promptly,” is the warning sent out by J. R. Watson, entomologist of the Florida Experiment Station, to growers in the citrus area which was devastated by the storm. “Shot-hole borers are minute beetles which frequently attack and quickly finish injured trees,” says Mr. Watson. “They usually do not work in a perfectly healthy tree. They get their name

from the small size and great numbers of the holes they make in the tree, giving the tree the appearance of having received a charge of small shot. Their presence can be detected by the presence of sawdust on the trunk and base of the tree.

Injured trees should be brought back into active growing condition as quickly as possible. Those attacked by the shot-hole borers in large numbers should be cut down and burned so as to destroy the borers and prevent them from attacking other weak trees. Devitalized trees can, to some extent, be protected from depredations of the borers by painting the trunk and larger branches with whitewash. Make the whitewash quite liquid so that it will run down

and fill up all cracks and crannies in the bark. To each bucket (three gallons) of whitewash add a handful of common salt. This will make it stick better.”

A Correction

IN THE article on “Diseases of Raspberries and Their Control,” by C. A. Boyer in the February issue, we made the author state that “Three of our most serious raspberry diseases, namely, leaf roller, mosaic and streak, are caused by virus.” Due to an oversight in copy reading, the term “leaf roller” instead of “leaf curl” was used. We make this statement so that readers will know that Mr. Boyer is not in the habit of calling an insect a disease.

You'll find Kelly quality in both these tires



THE regular Kelly-Springfield tire is built now, as it always has been, for the man who is satisfied with nothing short of the best the market affords.

For those who do not need the extra durability of the regular Kelly product, but who do want to get real value in a lower priced tire, Kelly builds the Buckeye, a sturdy, full-ply, full-size tire that compares favorably with many other tires offered at higher prices.

Whether you want the very best, or whether you simply want good honest tires at a modest price, you can purchase any tire marked "Made by Kelly-Springfield" with the fullest confidence that your money can't buy anything better.

The regular Kelly tire costs no more than any of the well-known makes. The Buckeye costs less. You can't go wrong on either.

"Kelly dealers everywhere—there must be one in your town."

KELLY-SPRINGFIELD TIRE CO.
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KELLY SPRINGFIELD PNEUMATIC TIRES

SPRAY with the **OSPRAYMO**
High Pressure Machines

Form a fine mist which stays on the foliage
and makes the job effective. Using an
OSPRAYMO means high pressure always.

OSPRAYMO sprayers have the last
word in mechanical agitators, with
two stiff adjustable brushes working
automatically in cleaning the suction strainer.
No clogged pipes or nozzles. Our slogan:
A Sprayer for Every Need—High Pressure Guaranteed

Write for catalog. Don't buy till it comes.

FIELD FORCE PUMP CO.
Dept. B, Elmira, N. Y.
45 years at Sprayer building

THE THREE RIVERS Growers' Association of Kennewick, Wash., contains nearly 700 members. It was organized during 1921-22 to handle strawberries, cherries and certain vegetables. Its membership at the time of organization was about 250.

The association operates in an irrigated district, and the rapid increase in production of various crops had brought about many serious marketing difficulties. Prior to the organization of the co-operative, various plans had been tried with indifferent success. A recent report of the association states that 1926 was the fifth year of co-operation and that the results were very satisfactory to 99 per cent of the membership.

Cherries were handled in 1926 for the first time and about 5000 crates were pooled. A material increase in the quantity of strawberries handled was reported.

LONG ago the manufacturers learned that marketing is a group problem, and they met that problem with group action—co-operation. The farmer lives in faith, plows in hope and markets by accident. He is the only manufacturer in the world who buys his material on a retail market and sells the finished product at wholesale. Supply and demand, like any other law in the natural world, can be made to serve man, or through ignorance, destroy him."



THE CO-OPERATIVES handling fruits and vegetables are the most widely distributed of all co-operatives, according to the Department of Agriculture. They have been exceptionally resourceful in developing new plans and in many cases have been pioneers in the merchandising of farm products.

There are fruit and vegetable co-operatives in all but three of the 48 states. Such associations are particularly numerous in California, Florida, New York, Arkansas, Michigan, Washington and Texas.

As far back as 1900, the volume of business handled by the fruit and vegetable associations was of significant size. In 1915, 32 per cent of the co-operative business reported to the Department of Agriculture was handled by the fruit and vegetable associations, although this group represented but 17 per cent of the total co-operative membership.

The number of co-operative fruit and vegetable associations increased between 1915 and 1925 by more than 40 per cent. The number of members increased by more than 60 per cent, and the volume of business as measured in dollars increased by nearly 40 per cent. In 1925, 1237 fruit and vegetable associations were reported to the Department of Agriculture. They had an estimated membership of 180,000 and they conducted business for the year amounting to about \$280,000,000.

The number of associations reporting, the membership and the amount of business conducted by the fruit and vegetable co-operatives in the leading states in 1925 were as follows: California, 225 associations reporting, 59,950 members, \$132,000,000; Florida, 98 associations, \$300 members, \$34,000,000; New York, 84 associations, 7900 members, \$8,000,000.

THE 1927 summer session of the American Institute of Co-operation is to be held at Northwestern University, June 20 to July 17 inclusive have been selected tentatively as the dates of the session. The 1928 summer session will be held at Berkeley, Calif., at the University of California.

The first summer session was held in 1925 at the University of Pennsylvania at Philadelphia, and the second in 1926 at the University of Minnesota, St. Paul. In going to Chicago this year, the trustees believe that an unparalleled opportunity will be afforded not only for a record-breaking attendance but for an intensive study of distributive problems of marketing as presented by one of the greatest food marts in the world.

The invitation of Northwestern University was supported by the American Farm Bureau Federation, the National Livestock Producers' Association, the Illinois Agricultural Association and several of the strong middle-western state farm bureaus and co-operative groups.

A FRUIT GROWERS' economic conference was held at Yakima, Wash., on January 25 and 26, under the auspices of the Washington State College Extension Service, from which important results may come.

In 1924, several conferences were held in the Northwest with the object of developing a marketing agency which would include all of the important units of the Northwest. At that time, all of the big northwestern co-operatives agreed to the plan, but

a heavy freeze occurred early in the spring, and because of the reduced crop that was in prospect, it was deemed inadvisable to proceed further with the development of the program at the time.

The meeting at Yakima in January represented a revival of this movement. Seventy representatives from the Wenatchee district attended, and there were also numerous representatives from other sections.

The plan developed in 1924 for organizing a super-exchange was approved, and a committee was appointed to proceed with its development. The conference voted that if unification of the existing organizations is impossible at the present time, the committee should direct a movement for the organization of the independent growers.

The proposed plan provides for an all northwestern fruit marketing agency, with the existing co-operatives federated together as sub-agencies. Four branches are to be established in terminal markets, and another will handle export business in foreign markets.

The organization committee consists of H. C. Bohlke, Grandview; E. H. Zickler, Buena; William McGonagle, Selah; M. Rumohr, Leavenworth; S. W. Ludwig, Peshastin, and E. W. Simonson, Wenatchee. These six men are to choose a grower in the Hood River district to serve with them.

At the conference, reports were also made by several sub-committees. The chairmen of the various sub-committees were as follows: J. A. Warman, Peshastin; J. B. Felts, Opportunity; P. R. Parks, Yakima; Luke Powell, Yakima; S. O. Pool, Wenatchee, and A. G. Stage, Peshastin.

The conference at Yakima also made recommendations for more efficient and more economical production. The removal of unprofitable varieties and the use of improved methods of handling the products were strongly emphasized in resolutions.

A FRUIT GROWERS' meeting of great significance took place in Martinsburg, W. Va., a short time ago. Because of the serious conditions which have been facing the apple industry in the section for the past year, a meeting was called at which were present 65 members of the Berkeley County Fruit Growers' Association, as well as representatives from Adams county, Pennsylvania, and Frederic county, Virginia. Steps were taken toward the organization of a single sales agency to serve the entire Shenandoah-Cumberland Valley apple belt, reaching from Harrisburg, Pa., to Staunton, Va., and comprising sections of Pennsylvania, Maryland, Virginia and West Virginia.

Unanimous support was given at the meeting to the idea of establishing a system of unified marketing by the co-operatives of the district and the abandonment of numerous small selling exchanges competing with each other to the disadvantage of all. The representatives also expressed themselves in favor of other meetings to be held in other sections of the district so that similar organizations may be formed for the entire territory involved.

A marketing committee consisting of Cecil Wood, Lee Goldsborough, H. W. Miller, Dudley Harley, Charles M. Lamar, Dr. A. Bruce Eagle, and D. Gold Miller was appointed. It will be the duty of this committee to survey various marketing systems in use and

for March, 1927

Page 17

report back at a later time a plan for a unified sales organization. It was expected that the report of the committee would be made at the annual meeting of the West Virginia Horticultural Society to be held on February 10-11.

A by-products committee was also named whose duty it will be to encourage the construction of additional by-products plants in sections and to promote the larger use of apple by-products. Such plants will prove a great help in providing a means for handling apples of inferior grade.

BERRY GROWERS and commercial packers of Oregon and Washington met on January 15 at Sumner, Wash., and perfected an organization that will conduct a nation-wide advertising campaign to stimulate consumption of preserves, jams, jellies and canned berries. The new organization will be known as the Berry Growers' Foundation, Inc., and will supervise the expenditure of \$50,000 annually for advertising during the next five years. The principal parties to the proposal are the Washington Berry Growers' Packing Corporation of Sumner, the Puyallup and Sumner Fruit Growers' Association of Puyallup, and the Berry Growers' Co-operative Association of Gresham, Ore.

In addition to the funds raised by the packing corporations and the growers' organizations, funds for advertising will be solicited by the new organization from preservers, glass manufacturers and other affiliated industries.

The plan for the Berry Growers' Foundation, Inc., was first discussed early in 1925. It was developed to a finished form by a committee representing berry growing and processing interests in the leading districts of the Northwest, including the Puyallup Valley, Whatcom, Snohomish and Clark counties in Washington and Multnomah county in Oregon.

The Puyallup Valley is generally recognized as one of the premier small fruit regions of the Northwest. In this section there are thousands of farms ranging from three to five acres, all devoted to small fruit raising. Principally the Cuthbert raspberry and the Evergreen blackberry are produced. Yields of raspberries average two tons per acre in the region and many of the better growers get three tons or more to the acre. Evergreen yields average about five tons per acre, with some small patches producing as high as nine tons to the acre. Berry growers in the Gresham district of Multnomah county, Oregon, principally grow Cuthbert raspberries, and here, too, yields run about the same as in the Puyallup district, although the farms are generally somewhat larger.

Because of the outstanding importance of the berry industry in these districts, it was recognized that markets for the finished product must be expanded if permanent prosperity is to be effected. The berry crop from these regions in 1925 was in excess of 100,000,000 pounds and growers received for it close to \$8,000,000.

The plan of the organization was unanimously endorsed and support was pledged by the financial interests of the Northwest.

In discussing the new organization W. A. Linklater, Puyallup, who was elected temporary chairman, said, "The prosperity of our territory depends in a large measure upon the return from the land. The highest per acre return from our land can be secured in raising berries. We cannot raise berries in large volume unless we have broadened markets." —W. L. Teutsch, Corvallis, Ore.

THE CALIFORNIA Vineyardists' Association was organized November 8, 1926, "to develop, safeguard and advance the interests of the vineyardists of the state of California." The principal office will be at Fresno. Thirty directors have been selected to serve one, two and three years, and thereafter terms of three years. There is no capital stock. Any person, firm or corporation growing grapes may become a member. There is an entrance fee of \$1 and annual

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Quality and Value without an Equal in the whole \$1000 Field

By long odds the most distinguished motor car ever introduced into the \$1000 field, this new Nash De Luxe Light Six is also the most remarkable performer.

Along with its notable beauty and classic body craftsmanship it has the vital superiority of a 7-bearing crankshaft motor—the ultra-modern type.

That gives you a superlative advantage over the standard 3 or 4 bearing motor in the way of matchless quietness and phenomenal smoothness thruout the full range of speed and power.

Colorfully finished in exquisite blue lacquer and enhanced with a wealth of

refinements and appointments it stands out as a motor car value clearly above and beyond comparison.

The attractiveness of the interior is enriched with a walnut finished instrument board and window ledges and choice upholstery of genuine Chase Velmo Mohair Velvet.

Headlamps as well as cowl lamps are executed in the bullet design. The steering wheel is of real Circassian walnut. There are bumpers in front and bumperettes at the rear, and a motometer surmounts the winged radiator cap. 4-wheel brakes and 5 disc wheels are also included as standard equipment within the price.

(497)

dues of \$1. The directors cannot levy assessments.

There is an advisory board of 79, the members of which represent the eight districts into which the state has been divided according to the number of cars shipped.

The association will act as a clearing house for various agencies marketing grapes. It will not handle grapes, but it hopes "to make it safer for the cash buyer to put his money and more of it into the purchase of grapes," etc.

ABOUT 40,000 tons of cling peaches were marketed by the California Canning Peach Growers of San Francisco during 1926. The greater portion was delivered to the canners in accordance with contracts.

The organization was formed in 1922 to represent the growers in dealing with the canners. There are about

1200 members with an acreage of more than 13,000 peach trees.

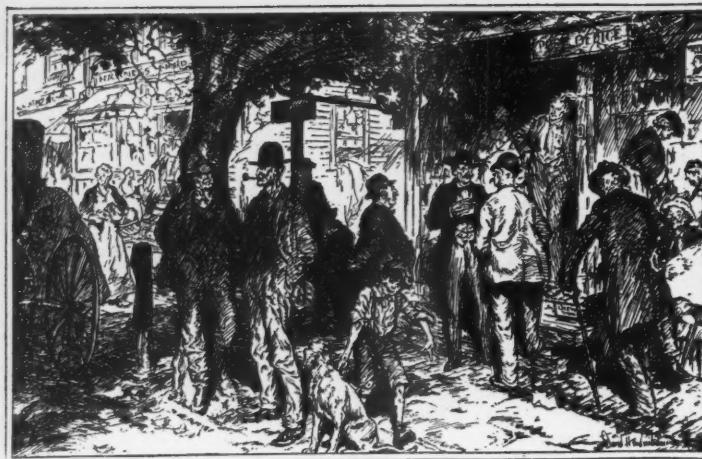
In addition to its bargaining activities, the association directs the canning and marketing of a part of the crop. During 1924, the association directed the packing and marketing of 267,713 cases; in 1925, 353,589 cases; and in 1926, 334,000 cases.

The income of the association is made up of annual dues, membership fees, an acreage charge, a service charge, interest on reserves, and a deduction of approximately five per cent from the returns paid to growers. The deduction is placed in a withholding account and is available as working capital. The deductions will be handled in time as a revolving fund.

The service charge is the principal source of income for meeting current expenses, and amounts to about \$1.50 a ton. It is collected from the canners. Four field offices are maintained

in order that the needs of the members may be attended to promptly.

OF NECESSITY, as commerce grows, organized and therefore centralized buying grows. Buyers naturally are interested in a low price. Now if the producers are unorganized, they can have no voice as to what the price shall be. They are not permitted even to suggest a price which they think is fair. A price is arrived at in some mysterious way in the commercial centers, and that price is flashed over the country. The producer, of course, has the option of refusing the price. But of what avail is this? What he needs is power somewhere to be exercised in his interest to at least suggest a price as a basis for negotiations, and this power cannot come into being until the producers are organized.—*Governor Frank O. Lowden*.



The Meeting Place

An Advertisement of
the American Telephone and Telegraph Company



It is not so long ago since people met in town hall, store or at the village post-office, to talk over matters of importance to the community. Then came the telephone to enable men to discuss matters with one another without leaving their homes. With the growing use of the telephone, new difficulties arose and improvements had to be sought. Many of the improvements concerned the physical telephone plant. Many of them had to do with the means of using the apparatus to speed the connection and enable people to talk more easily. This need for improvement is continuous and, more than ever, is a problem today. Speed and accuracy in

completing seventy million calls daily depends upon the efficiency of Bell System employees and equipment as well as upon the co-operation of persons calling and those called and numerous private operators.

It is not enough that the average connection is made in a fraction of a minute or that the number of errors has been reduced to a very small percentage.

The American Telephone and Telegraph Company and its associated Bell Telephone Laboratories have practically for their sole task the making of the telephone more serviceable and more satisfactory—as a means of conversing with anyone, anywhere, any time.

Unloads of 15 Fruits in 36 Cities During 1925

Carlots including boat receipts reduced to carlot equivalents

Cities.	Apples.	Grape-fruit.	Grapes.	Lemons.	Oranges ¹ .	Peaches.	Berries.	Straw-
New York.....	13,761	5,151	17,179	4,224	10,949	4,972	2,005	
Chicago.....	7,774	1,824	6,533	917	4,026	1,998	942	
Philadelphia.....	2,510	1,034	4,960	674	3,084	991	455	
Boston.....	1,111	1,198	5,218	478	3,390	925	856	
Pittsburgh.....	2,570	401	2,979	229	1,306	914	285	
Detroit.....	2,126	686	1,853	349	1,406	1,287	413	
Cleveland.....	1,570	607	2,393	328	1,358	849	260	
St. Louis.....	1,950	378	855	423	1,080	631	130	
Los Angeles.....	2,771	217	259	7	112	542	1	
San Francisco.....	906	285	2,882	303	1,141	186	2	
Baltimore.....	742	342	720	397	1,057	535	194	
Cincinnati.....	1,295	370	551	340	878	626	340	
Kansas City.....	1,421	294	506	253	417	278	145	
Newark.....	584	48	2,807	0	54	234	144	
Washington.....	557	279	234	65	477	273	71	
Indianapolis.....	730	274	183	159	471	399	129	
Buffalo.....	266	299	763	164	698	228	219	
Seattle.....	630	206	289	11	188	251	46	
Milwaukee.....	1,112	191	879	111	526	444	157	
Minneapolis.....	873	287	322	294	741	217	184	
Denver.....	581	229	299	117	321	219	89	
Columbus.....	439	213	233	111	442	371	145	
Atlanta.....	525	284	129	185	430	23	1	
Louisville.....	859	114	241	137	351	170	44	
New Orleans.....	474	42	227	19	250	207	2	
Providence.....	298	116	447	31	296	229	134	
Portland.....	443	178	258	117	66	259	20	
Memphis.....	540	132	133	203	319	70	0	
Omaha.....	767	116	360	118	249	185	86	
Birmingham.....	549	90	124	143	295	25	12	
Dallas.....	464	128	122	151	283	17	25	
Toledo.....	295	166	77	92	339	158	94	
St. Paul.....	429	148	136	70	229	146	46	
Fort Worth.....	366	70	97	75	129	8	29	
Spokane.....	137	58	71	50	107	157	13	
Salt Lake City.....	33	68	86	70	185	30	0	
Totals by commodities.....	52,481	16,528	55,555	11,448	38,049	19,084	7,758	
Total shipments for United States and imports.....	112,819	21,652	80,394	11,496	57,364	40,584	12,281	

¹Includes tangerines and Satsumas.

—Crops and Markets.

Markets and Marketing.

THE FOLLOWING remarks on the outlook for the fruit industry were taken from a recent report issued by the United States Bureau of Agricultural Economics:

"The trend of fruit production is upward and expansion of acreage would not be justified except under unusually favorable conditions. However, a crop of fruit as large as that of last year, which was due to the uniformly favorable weather, is not likely to occur very often."

"A continuing increase in the volume of both oranges and grapefruit may be expected, which makes the outlook unfavorable for additional plantings for some time."

"The apple industry is approaching a more stabilized condition but with an average crop, prices will undoubtedly be higher next season. Commercial plantings are hardly justified at present except where local production or market conditions are unusually favorable."

"New commercial plantings of peaches should not be undertaken in the southern states, since a large number of young trees have not yet come into bearing and production is rapidly increasing."

"Grape production is expected to continue heavy, and new vineyards should not be set out except where conditions are extremely favorable."

"Strawberry returns per acre with average yields in 1927 probably will be considerably less than the average for the past two years. Acreage has increased considerably and caution should be exercised by growers who contemplate increasing acreage this spring."

FOLLOWING the damage to Florida citrus from the cold of January, the estimate of total commercial production has been revised to 13,500,000 boxes, of which 8,000,000 boxes will be oranges and 5,500,000 grapefruit. This covers fruit already shipped and includes movement by boat and express.

A survey of the crop after January 1 showed a material increase over the October estimate of 15,000,000 boxes and indicated total shipments of close to 16,500,000 boxes. This has been reduced to 13,500,000 boxes, compared with 14,700,000 boxes shipped last season. Movement to February 1 has been approximately 1,000,000 boxes ahead of last season, indicating 2,000,000 less boxes to move after that date. Carlots to February 1 were approximately 22,300, with around 13,000 estimated still to move.

Damage was unevenly distributed both as to sections and individual groves. Many crops escaped without damage while others suffered heavily, and some were a total loss. In addition to the direct loss from frost, the prolonged dry weather has caused considerable dropping of fruit. This has been allowed for in the present estimate but if continued, may cut total shipments even below the present indications.

THE PLACE of the chain stores in the marketing of perishables was described in a talk by Mr. Baum before a meeting of state marketing officials in Chicago in December. During the past two years, 15,800 stores handled about 55,000 cars, valued at more than \$60,000,000. The chain store trade in perishables is steadily growing. Mr. Baum emphasized that growers' organizations who wish to sell to chain stores must standardize rigidly and use packages suited to

chain store distribution. There is a decided tendency toward the use of smaller packages for satisfying the demands of chain store trade.

Special sales of the chain stores offer an opportunity for moving tremendous quantities of perishables. In one week in New York, one system of chain stores sold 150 cars of peaches and 500 cars of apples.

The purchasing department of this organization was described in the January issue. In distributing perishables from receiving points to retail stores, savings have been effected by establishing unloading stations in various sections of New York, from which the products are hauled with motor trucks.

EXPORTS of apples from Canada in 1926 exceeded those of 1925 by about 50 per cent. Exports during the year ending March 31, 1926, amounted to 1,388,493 barrels worth \$6,250,186. The bulk of the exports go to the British Isles. Other heavy purchasers are the United States, New Zealand, Sweden, Newfoundland, China and Denmark. The principal apple growing provinces in Canada are Nova Scotia, Ontario and British Columbia. New Brunswick and Quebec grow a considerable quantity.

DURING 1926, 25 canneries operated in Oregon, and they packed 3,000,000 to 4,000,000 cases, using about 60,000 tons of fruits and vegetables. The amount invested in each case is about \$1, and when the investment of allied industries handling cannery supplies is included, the total Oregon investment depending upon the canning industry will reach \$7,000,000 to \$8,000,000. It is truly a very large industry.

Salem is the largest packing district in the Northwest, its output having increased from 30,000 cases in 1911 to 1,100,000 cases in 1926. Ten years ago there was only one cannery in the district, while last year there were four privately owned and two co-operatively owned plants. It is quite common for the canners to bring in large quantities of apples and pears from other sections for canning. The growers in the vicinity of Salem have gone into small scale production to a very large extent. From 60 to 75 per cent of the small fruit and cherry output of the canneries is obtained in the immediate district.—Abstract from address of W. G. Allen before Oregon State Horticultural Society.

A DEMONSTRATION of the difference between the marketing of the products of organized labor and of unorganized agriculture has just been made in Wenatchee.

Organized barbers have their labor to sell. Their finished products are haircuts and shaves. Up to the first of October the price of these products was 50 cents for a haircut and 25 cents for a shave. The price now is 65 cents and 35 cents, an increase of 30 per cent and 40 per cent respectively. At the same time the barbers put up the price of their products, the price of apples, the chief agricultural product of this community, already low, took another tumble. Farmers are getting just about enough for a box of apples to pay for a haircut and a shave. The labor that goes into the one is about five times what goes into the other. The difference is organization.

A volume might be written on the value of organization, but the above demonstration covers it all. We re-

joice to see the barbers able to demand a fair return for their labor. Our only regret is that farmers are so slow to profit by their own sad experience and the happier experience of others.—*Jim Hill-O-Gram.*

THE CANADIAN Department of Agriculture reports that the first strawberries grown north of latitude 53 were produced last year in the Nipawin district of Saskatchewan. The berries were of good size and flavor. Several thousand cases were shipped to Winnipeg, where they found a ready sale.

Strawberries have been grown for home use in the Nipawin district for a number of years, but the lack of transportation facilities prevented development of the industry on a commercial basis. Extension of the railway from Prince Albert last year opened up the market in Winnipeg.

The production of apples, cherries and plums, as well as strawberries, in the prairie provinces of Manitoba, Saskatchewan and Alberta is a commercially feasible proposition, according to Canadian horticulturists.

ONE OF the valuable papers presented at the annual meeting of the Oregon State Horticultural Society at Salem, Ore., was that presented by L. M. Hatch, president of the Puyallup and Sumner Fruit Growers' Association located at Puyallup, Wash. His discussion of the economic situation with reference to small fruits is of interest not only to growers on the Pacific Coast but to those in all other sections of the country as well.

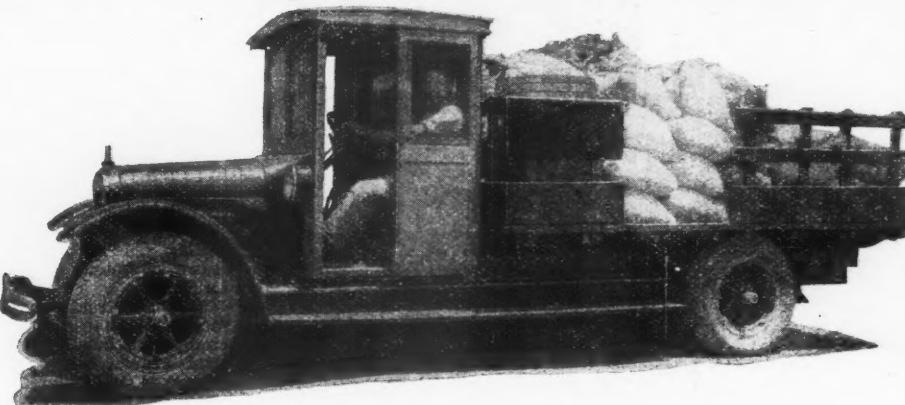
Mr. Hatch stated that the pack of canned berries in the Puyallup district increased from 851,187 cases in 1919 to nearly 2,000,000 cases in 1926. The output of barreled berries increased from 16,000 barrels to 80,000 barrels in the same time, and the prospects are good for a still further increase. Strawberry plantings have been increasing rapidly. With a normal crop in 1927, a pack of 50,000 to 60,000 barrels may be expected as compared with 33,000 last year. Total production is expected in 1927 to show an increase over that of 1926 of from 4000 to 5000 tons.

The Pacific Northwest packed about 131,000 cases and 6000 barrels of raspberries in 1919 and about 200,000 cases and 35,000 barrels in 1926. The production of 1927 is expected to exceed 12,500 tons. Lower prices should be expected.

The saturation point in raspberry production has been reached for the time being, in Mr. Hatch's opinion. Cold storage holdings on September 1, 1923, were 18,756,000 pounds and on September 1, 1926, they were 59,320,000 pounds. The excess holdings this year are raspberries to a large degree, notwithstanding the fact that the 1925 crop was only about 50 per cent of normal and that very little 1925 stock remained unsold at the beginning of the crop season. The 1926 yield was 10 to 20 per cent above normal. Conditions justify the conclusion that a much lower price level will exist during the next two or three years and that additional plantings are undesirable.

The blackberry acreage has increased greatly in the Pacific Northwest and the Oregon-Washington canning pack last year was more than double that of 1919. The barrel pack was four times as great and the total crop exceeded by 25 per cent that of any previous year. The wild Evergreen blackberry that is found on many thousands of acres in the district is one of the big stumbling blocks in the way of planting more cultivated blackberries.

The Loganberry industry appears to be in somewhat better condition, according to Mr. Hatch. Since the bottom dropped out of the market following the great wave of planting from 1910 to 1920, the acreage in Loganberries has decreased sharply. The berry has increased in popularity, and a considerable export trade to England has developed. The crop of about 8000 tons moves into consumption quite freely, and it would



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seem that there is reasonable assurance of from five and one-half to six cents per pound to the grower for

several years.

The market which the northwestern small fruit growers have found for their product has resulted from sheer merit of the article sold, according to Mr. Hatch. No constructive merchandising program for the product has as yet been attempted. There is no doubt but that the demand for small fruits of the district could be greatly extended if such a campaign could be undertaken and pushed to a conclusion under competent leadership.—George N. Angel, Oswego, Ore.

FOLLOWING the construction of the new produce markets in Chicago, Newark and Philadelphia, the Cleveland dealers are reported to be working out plans for a new market terminal. No site has been selected as yet, but it is reported that developments in this direction may be expected in the near future.

The new market will consist of 85 to 100 units and will probably be modeled along the lines of the Chicago

market, according to reports. One large produce house in Cleveland has indicated its willingness to contract for three to five units for its business. Dealers are known to favor construction of a new market.

THE EXPORTS of canned fruits in 1925 and 1926, according to R. S. Hollingshead of the Bureau of Commerce, were as follows:

EXPORTS OF CANNED FRUITS (In thousands of pounds.)		
	Estimate 1925	
Cherries	2,099	1,695
Peaches	67,200	84,749
Pears	45,360	69,458
Pineapples	33,550	36,268
Apricots	34,200	33,403
Other fruits	27,970	22,548

Monthly Market Review

THE FOLLOWING summary of the apple marketing situation was furnished by the United States Bureau of Agricultural Economics on February 10:

"As winter moves along the apple situation brightens a little and there are more cheerful features than might

have been the case after one of the largest market crops ever grown. The price tendency was slightly downward until December, when some markets began to show recoveries, and in January and early February there were various gains of 25 cents to \$1 per barrel, also a fairly strong tone in northwestern producing sections. The export trade continues a cheerful feature. About 6,000,000 barrels from the United States and Canada have gone to foreign markets, or about one-seventh of the combined commercial crop, which is mainly in the United States this season. Exports seem likely to continue at a good rate until late spring. Early reports from Australia and New Zealand indicate a reduction of exports to Europe, possibly of as much as 50 per cent, so that the marketing season for American apples will be extended something like three weeks, which will mean a possible demand for hundreds of thousands of barrels more than expected. Prices in foreign markets have been well sustained and have had a strengthening effect upon the domestic apple market situation."

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Tree Tanglefoot is quickly and easily applied with a wooden paddle. For tree surgery nothing equals this material. It waterproofs crotches, wounds and cavities when nothing else will. Leading horticulturists everywhere endorse it. Seed, hardware and drug stores sell it. Prices: 25-lb. pail \$11, 10-lb. can \$5.25, 5-lb. can \$2.75, 1-lb. can 60 cents.

An illustrated book on leaf-eating insects sent free on request

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A good spray outfit, even if it should cost a few dollars more, is real economy in the end. Just a little increase in the percentage of "Extra Fancy" will more than pay the difference.

Forty-two years of experience are built into every BEAN. And during these years we've developed practically all of the important sprayer features in use today.

Among these notable improvements are the BEAN permanently Porcelained Cylinders which last 10 times as long as ordinary cylinders; BEAN Patented Pressure Regulator, no danger at highest pressure; BEAN Troubleless Ball Valves with threadless covers and removable and reversible seats; BEAN Eccentrics instead of cranks; BEAN Long-life Pump without stuffing-boxes or stuffing-box troubles; and many others. More over, all BEAN working parts are in plain sight and easily get-at-able.

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Book Review

New Book on Principles of Plant Growth

FRUIT GROWERS who want more detailed information about plant life than is contained in the ordinary popular article will find the new book on "Principles of Plant Growth" by Wilfred W. Robbins very much worth while. The author is associate professor of botany in the University of California.

The book treats a more or less technical subject in surprisingly clear and simple language. The average practical grower will have no trouble whatever in understanding the language used and will be able without a doubt to gain much valuable information on the finer points in plant life which may not have been very clear to him. A better understanding of these matters is of great help in the practical operation of an orchard and will enable growers to see quickly the bearing of information and of recommendations they obtain from books, bulletins and articles on fruit growing.

The book is sold by John Wiley and Sons, Inc., of New York, for \$2.25.

New Book by Stuckey and Matthews

"HORTICULTURE" is the title of a new book written by H. P. Stuckey, director of the Georgia Experiment Station, and C. D. Matthews, chairman of the Division of Horticulture of North Carolina State College. The position of the authors in the horticultural field is in itself a strong testimonial for the book.

The new book was written for students in high schools and elementary colleges and is elementary in scope. Particular attention is given to fruits, several chapters being devoted to most of them. The important phases of culture are classified under appropriate subheads. The language employed is clear and direct.

Considerable attention is also given to vegetables and landscape gardening from the standpoint of home grounds.

The book is sold by Smith, Hammond and Company of Atlanta, Ga.

Insects of Western North America

A NEW volume entitled "Insects of Western North America" has recently been placed on the market. It was prepared by E. O. Essig, associate professor of entomology of the University of California. The book is

quite comprehensive in character and is intended primarily for students in entomology. The subject material is arranged according to classes, orders, genera, etc. However, there is a very complete index, and those not familiar with technical methods of classification may readily find information about any particular insect in which they are interested.

The book represents a very careful study of western insects, and all of the important information accumulated to date on western insects is incorporated in the book. The book concerns itself primarily with a description and habits of insects prevalent in the western states. Brief control methods are presented in most cases.

The book is sold by the Macmillan Company of New York.

Revised Book on Fertilizers

A SECOND revision of Dr. Edward B. Voorhees' book on "Fertilizers" has recently appeared. It was prepared by Sidney B. Haskell, director of the Massachusetts Agricultural Experiment Station. The book is one of the well-known Rural Science Series edited by L. H. Bailey.

In the early chapters attention is given to natural fertility of the soil, sources of loss of the elements of fertility, the function of manures and fertilizers, and the need of applying artificial fertilizers. The different kinds of fertilizers are then classified and discussed. The final chapters give attention to fertilizers for different classes of crops.

The book is practical in character and its contents can be readily understood by farmers and fruit growers in general. It is without doubt a valuable contribution to the literature on soil fertility. It is sold by the Macmillan Company of New York for \$2.50.

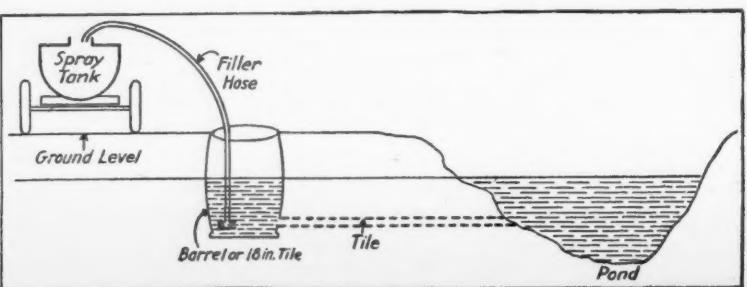
New Bulletin on the Tractor

"THE TRACTOR on California Farms" is the title of Bulletin 415, recently issued by the Agricultural Experiment Station, Berkeley, Calif. The authors are L. J. Fletcher and C. D. Kinsman. While the bulletin pertains to the use of tractors on farms in general in California, much attention is given to the use of tractors in orchards, and it will therefore be a valuable publication for fruit growers to read. Copies can be obtained from the Agricultural Experiment Station, Berkeley, Calif.

Filling a Spray Tank From a Pond

AMERICAN FRUIT GROWER MAGAZINE: I am enclosing a sketch of an improved method of filling a spray tank from a pond, spring or creek. I have been using this system and find that it works very satisfactorily. Before using the system, my heavy spray outfit was continually cutting into the soft bank of the pond, and there was always danger of tipping over the spray rig. Also, it was very unhandy to walk on the slippery bank when handling the suction hose, and it was very hard

to keep the strainer out of the mud. As is indicated in the diagram, a barrel or an 18-inch tile is sunk in the ground so that the bottom is below the level of the water in the pond and at a sufficient distance from the pond so that the spray rig can be kept on firm ground. Tile three or four inches in diameter are then laid in a trench connecting the barrel with the pond. I use a siphon filler which is operated by the spray pump, and the filler is placed in the barrel of water, as indicated.—Jesse Clark, New York.



Outline sketch of improved method for taking water from a pond for spraying

Finished Vinegar Should Be Tightly Stoppered

By W. A. Ruth

Illinois Agricultural Experiment Station

VINEGAR, after reaching its highest acetic acid content, will "go to water" rapidly if exposed to the air in a warm room. Many fruit growers who make vinegar do not realize the importance of making their barrels or other containers air tight after the vinegar has attained its full strength. The vinegar (immediately after the cider has become "hard") should, in course of manufacture, be given the maximum exposure to air until this point of high acidity has been reached.

On October 14, 1925, two one-gallon glass bottles were filled in our laboratory to a point just below the shoulder with vinegar on the down grade. Its highest acetic acid content, probably about 5.5 per cent, had been reached some time previous. The necks of the bottles were covered with cheesecloth to permit the access of air, while keeping out flies. The arrangement was comparable to partly filled and unstoppered barrels. The bottles were set in the laboratory, which had an average temperature of about 70 degrees Fahrenheit. From time to time the acetic acid content was determined. The figures follow:

PER CENT OF ACETIC ACID CONTENT ON SUCCEEDING DATES.

Date.	Bottle No. 1	Bottle No. 2
Oct. 14 (1925) ..	3.7	3.8
21	3.7	3.8
27	3.65	3.75
Nov. 3	3.47	3.63
10	3.25	3.50
17	3.01	3.05
Jan. 19 (1926) ..	2.05	2.57
Mar. 22	1.25	1.60
May 20	0.80	1.15
June 26	0.60	0.88
Dec. 8	0.05	0.35

The results illustrate the fact that significant losses may occur within short periods. For example, between November 3 and January 19 one sample had lost 41 per cent of its acetic acid, while the other had lost 29 per cent.

The rate of loss is determined by the temperature as well as by the degree of exposure to air, but lowering the temperature by keeping the strong vinegar in a cold place is not to be considered as practical as tight stoppering.

The figures also emphasize the fact that vinegar should not be bought or sold in bottles or other containers which are too large to be used up by the consumer within a comparatively short time. Even if such vinegar has been pasteurized, deterioration is likely to occur by reinfection after the consumer starts to use it.

One point of interest in connection with the above test is the fact that the color of the vinegar in the bottle deepened as it aged. At the same time, its aroma disappeared.

Too Many Busy Bees

By Oscar H. Roesner

FRUIT GROWERS in certain foothill sections of California have recently been faced by a new problem—too many busy bees—strange as it may seem.

In the past, there have been just about enough bees, with the wild ones and those kept mostly for that purpose, to pollinate the fruit blossoms. But lately, bee owners from the valley have hauled up hundreds of hives of bees and scattered them over the foothill sections. With so many millions of newcomers, there have not been flowers enough to supply the necessary food, and as a result the bees have turned to eating fruit, causing considerable damage. Crops in many berry patches have been failures due to the hungry bees sucking the juice of the berries. But the bees have been especially severe on peaches and plums. These fruits, after being attacked by the bees, look as though they were wormy, and they must be classed as culs.

The foothill fruit growers hope to get protection from this horde of too



PUBLIC preference chooses the inimitable Chrysler "60"

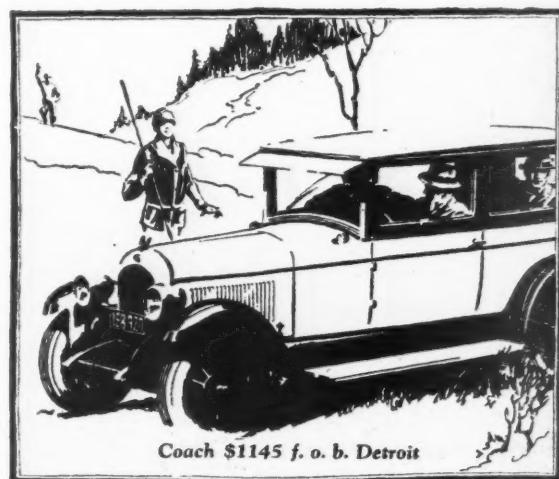
ONE of the most convincing proofs of Chrysler "60" superiority is trying to match its features in any other six of its type and price.

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Impulse neutralizer;
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Full pressure lubrication;
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These, with many other features that cannot be imitated, have been embodied in the Chrysler "60" ever since its introduction.

These typical features of the Chrysler "60" were harmonized into the car's original engineering design—and are thus uniquely Chrysler—insuring that flashing speed of 60 miles and more per hour, enviable acceleration of 5 to 25 miles in 7½ seconds, with the almost magical handling and operating ease that are typical of every Chrysler, and endure throughout its long life.

It is for this fundamental reason that the Chrysler "60" has been accorded a public preference that has contributed substantially



to Chrysler's dramatic rise from 27th to 4th place.

Chrysler "60" prices—Touring Car, \$1075; Club Coupe, \$1125; Coach, \$1145; Roadster (with Rumble Seat), \$1175; Coupe (with Rumble Seat), \$1245; Sedan, \$1245.

F. O. B. Detroit, subject to current Federal excise tax.

All Chrysler cars are protected against theft under the Fedco System. Chrysler dealers are in position to extend the convenience of time payments. Ask about Chrysler's attractive plan.

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CHRYSLER "60"

CHRYSLER MODEL NUMBERS MEAN MILES PER HOUR

many busy bees through legislation limiting the distribution of swarms in those sections.

Treatment for Ground Squirrels

THE GROUND squirrel (also called the salamander in Florida) does much damage by tunnelling through the earth beneath the roots of plants. It makes many openings in its tunnels, and poisonous gases and poison bait can therefore be used to combat the pest.

The following mixture has been found useful for introducing into the tunnels:

Sweet potatoes, carrots or parsnips, 4 qts.
Alkaloid strichnine $\frac{1}{2}$ oz.
Saccharine $\frac{1}{2}$ oz.

Cut the sweet potatoes, carrots or parsnips into about half-inch pieces, moisten with water and allow to drain. Mix thoroughly the strichnine and saccharine. Sift the mixture over the sweet potatoes. The bait should

be placed around the entrances to burrows and where the gophers are working.

Another good bait consists of corn poisoned with strichnine. To make this, dissolve one-half ounce of strichnine sulphate and one teaspoonful of starch in two and one-half pints of water. Mix this with one-half pint of fine salt and one-half pint of starch. Stir thoroughly with an egg beater, put on the fire and bring to a boil; then pour it over eight quarts of shelled corn. The bait should be applied around the entrances to burrows and where the gophers are working.

The ground squirrels can also be killed by dropping a small handful of calcium cyanide crystals into one of the regularly used tunnels. Some persons cover the cyanide with earth packed solid, but this is not necessary, since the gas is heavier than air and will settle to the low points in the tunnels. The gas is quite poisonous and will kill the animals when they breathe it.

In lawns, ground squirrels can usually be drowned out by turning a hose into their tunnels.

Revised Leaflet on Spraying the Apple Orchard

WHEN winter comes, spring cannot be far behind and fruit growers are commencing to think of spraying their orchards.

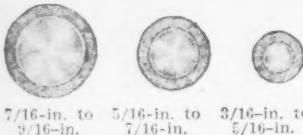
"While the spraying season will not be here for a short time, now is the time farmers should be getting their spraying rigs in good running order," says F. C. Sears of the Massachusetts Agricultural College. If the spray rig needs to be put in order when it should be working, the real value of the spray is lost.

"Spraying the Apple Orchard," revised by Prof. Sears, is ready for distribution. Write Massachusetts Extension Service, Amherst, for Leaflet No. 68 Revised, which discusses spraying questions which confront the fruit grower in Massachusetts.

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To prove to you the superior quality of our Nursery stock, we will send postpaid 10 peach trees, your choice of Carmen, Belle of Georgia, Elberta, J. H. Hale and Heath Cling.

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The Strawberry Industry of Oregon

By C. E. Schuster

Oregon Agricultural College

THE STRAWBERRY industry of Oregon is specialized not only in regard to the kind of berries grown but also as to the market for these berries and the section from which they come.

When strawberry growing is mentioned, the thought is naturally of the fresh berry topped with sugar and cream. Such berries are raised all over the state for home consumption and the local market. There is usually a sufficient acreage around any of the local markets in the state, so that strawberries need to be shipped but very little from one section to another for the fresh trade.

Outlets for the Product

In addition to the supply raised for local markets, the Hood River Valley has each year shipped many carloads to eastern markets. The Hood River berry, as it is known in many places, is the Clark Seedling, a berry of local origin, which is primarily a shipping berry, being very firm and solid. It is equally good for canning, but on account of being a light producer, it is not a profitable berry for the growers to raise at cannery prices.

By far the greater part of the strawberry tonnage is used by the canneries and the barreling plants. The canning trade has been growing gradually over a period of years, while the barreling trade has been developed by leaps and bounds during the last few years.

Varieties

For the canning trade the Ettersburg 121 is preferred. This berry is the best canning berry yet developed for this section. It is also the most exacting variety yet tried out by the growers. It does not produce on sandy soil or off the loamy soils of the hills, but thrives on the heavy clay soils of the valley floor. It can even be grown on land where drainage is so poor that dead furrows are plowed out every 75 to 100 feet to provide surface drainage. Of course, growers on such lands do not obtain the crops that growers do on well drained heavy land, but they are making money, in the average years, on such soils. This variety seems to contradict most of the recommendations regarding the suitability of soils for the average strawberry variety. It thrives and flourishes on land much heavier than that considered ideal for the development of other varieties.

The Wilson is still used as a canning berry, being second only to the Ettersburg 121. This variety seems to demand the very richest soils of the section. In some of the new places or territories, where the land has recently been cleared, the Wilson is yielding very satisfactory returns. On the whole, the cultivation of this variety is rapidly declining in most places. Once the land is cultivated for any length of time, there is difficulty thereafter in raising sufficient tonnage of Wilsons to pay for the trouble and primarily in obtaining a berry of marketable size.

Soft Berries Used for Barreling

For the barreling trade, the Marshall and Oregon are used almost exclusively and are known locally as the soft berries. They are entirely too soft for satisfactory canning, but are very satisfactory for the barreling trade, due to the quality, flavor and general characteristics of the berries. Both of these varieties also produce berries normally too large for the canning trade, which does not rate them very high as canning berries. Many people use them for home canning, due to the excellent quality, but even in such cases the Ettersburg 121 is tending to displace all others. The Oregon and the Marshall have a wide adaptation as to type of soil but demand in all cases the lighter, well-drained soils for heavy yields.

We find them being grown in the river bottom soils and on the second and third benches, as well as in the roll-

ing foothills of the Cascade and Coast Range mountains.

Aside from the varieties mentioned, we find a few others grown in small quantities. The Gold Dollar is used as the early berry, but unless it is grown on warm, sandy soils, it is not much earlier than the Marshall and is very much inferior in quality.

Everbearing Varieties Have Limited Field

The everbearing sorts have but a limited field in this state. In the western part of the state, where most of the population of the state is located, we find a few being grown for local use. A relatively small acreage suffices to supply the demand for this out-of-season fruit. Furthermore, irrigation is necessary in order to produce a crop, and relatively low prices are usually obtained for the fruit, so that the incentive for growing everbearing strawberries is not very strong.

In the eastern part of the state, particularly in the high plateaus, there is a definite place for the everbearing strawberry. In many sections, frost is an ever-present menace, and the fact that the everbearing strawberries will produce another crop of blooms after once being frosted, gives additional value to this type of berry. The Superb does best in the eastern part of Oregon, while the Progressive is commonly found in the western part. The Progressive seems to develop higher sugar content during the cooler weather and the cloudy weather of the fall, where the Superb fails under such conditions.

Planting Systems

For the most part, the berries are planted three feet each way, although some growers crowd the plants a little closer in the row. On good land the plants will often touch each other at a distance of three feet in the row. This distance of planting allows for cultivation both ways, which greatly reduces the cost of cultivation, as the work is done mainly by horse labor. The amount of hoeing necessary varies greatly with the soil and the time of year it can be first cultivated. Early cultivation, as is obtained in many foot-hill soils, makes it possible to kill the weeds and very definitely head off the later difficulties which are often found on the heavier soils, where the weeds get a good start before cultivation can be commenced.

Planting at distances of three feet apart or even closer confines the growing of the plants to the hill system. The matted row is practically never seen except possibly in some small home gardens where bountiful irrigation is practiced. Even in those districts where irrigation is practiced in the eastern part of the state, the matted row system is not used. The hill system is chiefly used, due to the necessity of cultivation for the conservation of moisture. It also seems to have the added advantage for this section of producing better quality and better appearing berries as compared with the matted row. In order to grow the plants in a hill, all runners are kept cut off during the life of the planting. While it may necessitate more work than allowing the runners to set plants, it nevertheless seems to excel the matted row in the production of better berries, which is made possible by the conservation of moisture.

At least 95 per cent of the growers cut the tops each year, working such material into the soil. While this is a generally accepted practice, growers will be found who are not using this method and feel that they are getting equally satisfactory results.

Marketing Methods

Most of the berries are marketed directly to the barreling plant or to the cannery. A few of these are sold through associations, but probably the bulk of the crop is handled by individual contracts between the different parties. The berries shipped from the Hood River Valley are shipped through an association, and there are one or two other associations which also handle strawberries, but these really constitute only a small part when the whole acreage is considered. Prices have been very good, and the demands have been so keen that there is no tendency for a decrease in price. It is therefore possible for each grower to market his own crop individually to good advantage.

Picking Seasons

The season usually opens with light shipments of early berries from the southern part of the state. This acreage is more or less limited, as it comes in competition with the large shipments from California. Very shortly after this follow the berries from the lower part of the Willamette Valley, which constitute the first heavy picking. Following the first of the berries of the valley floor of the Willamette Valley, we find a succession of berries coming from the foothills. These may follow at from two to four weeks after the first picking made in the valley. The berries in the higher altitudes, where considerable acreage is being developed, are the latest of this group. From two to four weeks after these berries are ripe, berries from the sheltered valleys on the west side of the Coast Range mountains, near the coast, will be on the local markets. These are the last regular crop berries produced in the state. Of course, following these at all times of the season up until frost kills them, are the Progressive everbearing berries for the western part and the Superb for the eastern part of the state.

Pecan Rosette Controlled by Soil Treatment

THE ROSETTE of pecan trees, indicated by wrinkled yellow-mottled leaves bunched at the end of the branches, is more severe on trees growing in soils deficient in nitrogen and organic matter than in trees growing under favorable soil conditions. These facts have been established by experiments conducted by the United States Department of Agriculture, which are reported in Farmers' Bulletin 1378.

The experiments extended over several years and were conducted in two badly rosetted orchards growing on soil low in organic matter and fertility in general. One orchard was plowed and thoroughly cultivated, and cover crops were grown and turned under each year. The other orchard received only a light disk annually, and weeds and grasses were allowed to grow without being plowed under. In the latter orchard, the vegetation was removed as hay. Chemical fertilizers of different kinds were used in the experiments, but they had no influence in decreasing or increasing rosette.

The orchard in which cover crops were grown and turned under showed a steady increasing improvement until the trees became apparently free of rosette. In the second orchard, there was a steady decrease in the nitrogen and organic matter content and a marked increase in the amount of rosette, resulting eventually in abandonment of the orchard.

A copy of Department Bulletin 1378, which describes these experiments, may be obtained from the United States Department of Agriculture, Washington, D. C.

A TOTAL of 1,100,000 gophers were killed in the Imperial Valley of California during a bounty period which started June 1, 1925, and ended February 1, 1927. Due to the great numbers of gophers and to the damage they were doing, the county supervisors established a bounty period and voted to give 10 cents for each gopher killed and whose tail was produced as evidence. A total of \$110,000 has been distributed to trappers. Many people devoted their entire time to the business and made good wages.—A. W. Swanson, California.

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Clean Cultivation in Orchards

IN 1916, the British Columbia Agricultural Experiment Station began a test of clean cultivation in a two-year-old apple orchard. The soil was kept clean cultivated for 10 years, being worked after every irrigation and after any heavy showers which fell. No weeds were allowed to grow. Neither was any barnyard manure nor chemical fertilizer applied to the soil.

During the first few years of the test, the trees grew well and produced fair crops. After six years, however, the trees showed reduced growth and a devitalized appearance. It was noted that it was difficult to secure a uniform distribution of irrigation water, thus indicating that the physical condition of the soil had been impaired. The large amount of labor involved made the cost of operation high.

The trees were in a weakened condition in the fall of 1924, and the severe freeze in December of that year injured the roots to such an extent that many trees died. The losses were so serious that all of the trees were removed from the orchard in 1925.

It was found that this method insured the greatest freedom from rodent injury and entailed the use of the smallest amount of irrigation water of any system that has been tried by the station. However, it was concluded that clean cultivation of orchards is a dangerous method to use under Okanogan conditions and that it should be used only under exceptional circumstances, such as in the event of a severe infestation of rodents or an acute water shortage during the growing season.

German Fruit Imports Increasing

ACCORDING to an article by D. J. Moriarty which recently appeared in *Commerce Reports*, Germany is again taking its place as a leading fruit importing country. In 1925, its total imports of fresh fruits reached 1,404,000,000 pounds, as compared with 1,215,000,000 pounds in 1924 and a yearly average of 1,329,000,000 pounds in the five-year period of 1909-13.

Oranges led in the German fresh fruit imports in 1925, with apples a close second and grapes and lemons ranging next in importance. The combined imports of these four fruits represented 80 per cent of the total German imports of fresh fruits. Other fresh fruits which were imported in considerable quantities were bananas, pears, quinces, berries, Damson plums, peaches, cherries and pineapples.

Germany grows only a small quantity of fruit. The exports of fresh fruit in 1925 were only 1.5 per cent of the fresh fruit imports, and the average for the five years 1909-13 was but three per cent of the import average. Because of this fact, and because the German population is large and is engaged chiefly in industrial pursuits, the opportunities for development of import trade in Germany are large.

GERMAN IMPORTS OF FRESH FRUIT
(Thousands of pounds)

Fruits	1925	1909-13 (average)
	Per cent of total	Percent of total
Total	32.9	22.0
Oranges ¹	460,128	29.4
Apples	411,905	43.0
Grapes	140,910	10.0
Lemons ²	113,322	8.0
Bananas	89,551	6.4
Pears, quinces	57,366	4.0
Berries ³	49,328	3.5
Damsons	28,260	2.0
Peaches ⁴	15,127	1.0
Cherries	10,866	(*)
Pineapples ⁵	7,382	(*)
St. John's bread	1,021	(*)
Other ⁶	19,805	1.4
Total	1,404,148	1,329,771

¹Includes mandarins.

²1912-13 average; from 1909 to 1911 lemons were included with dates and figs.

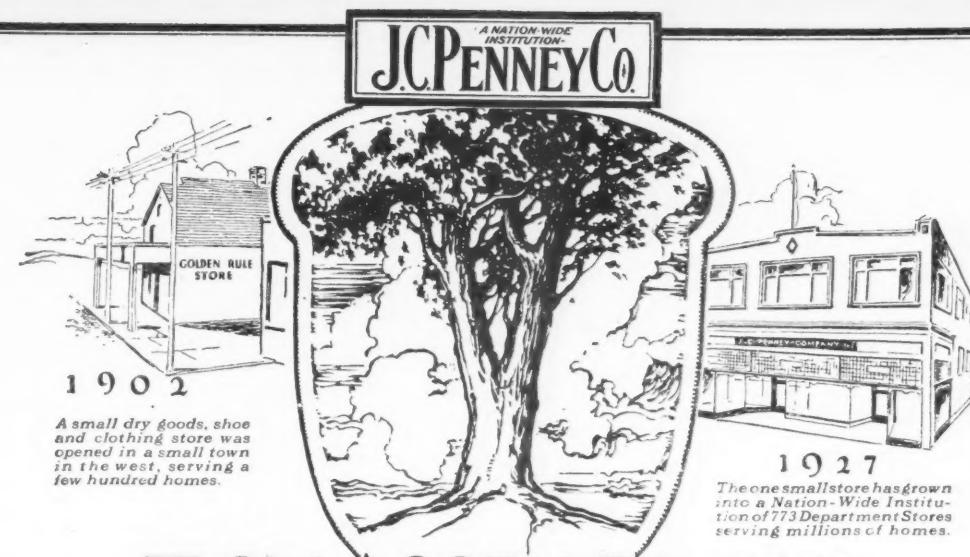
³Fresh and prepared.

⁴Strawberries, raspberries, gooseberries, etc.

⁵Apricots were included with peaches in 1909-10.

⁶Less than 1 per cent.

⁷Includes apricots, plums, etc.



FROM ACORN TO OAK

*After 25 years of growth
now a nation-wide shopping service*



WE are celebrating with pride and thankfulness our Twenty-fifth or Silver Anniversary—with pride for the privilege of serving the American public—with thankfulness for the generous response that has come to our effort. Since the Spring day in April, 1902, when Mr. Penney inaugurated, in a small and inconspicuous manner, a Retail Shopping Service which was destined to become one of Nation-wide Helpfulness, a quarter of a century has passed.

It has been a period of notable growth and expansion, of winning millions of friends, of serving them faithfully, of basing achievement upon the good will of mutual satisfaction.

During all these eventful years, we have been mindful of our responsibilities to the legion of patrons who have contributed and are today contributing, so continuously and so generously, in helping make our Service one not of profit alone but of the confidence that rests on good will.

Never for a moment have we knowingly wavered from the responsibility of this relationship. It has always been to us an inspiration to reach out for greater things, that we might be the better prepared to render a Service which should prove to be more and more beneficial to the increasing numbers who come to us.

Not only is that one little Golden Rule Store of 1902—now itself grown to far larger proportions—still serving the people in and about Kemmerer, Wyoming, but there has sprung from

its applied principles and policies, others to a present total of 773 Department Stores, scattered over 46 States.

All these are children of what we now affectionately term, The Mother Store; all happily operate in the Service of the public under the name of the J. C. Penney Company. The Founder of this Organization—Mr. James

C. Penney—built up in his pioneering days more enduring and substantially than he knew.

His ideals and practices—square treatment alike to all always—and the extent to which he packed Value into every Dollar of purchase—these constitute the pattern according to which this enormous business has been shaped and which has caused it to grow until it has now become a Nation-wide Institution, serving more than 3,000,000 homes.

The dynamic selective and buying power of the Company created by its tremendous volume of cash sales, which, in 1926, amounted to \$115,682,737.86, gives a saving power to the public which means much to the thrifit and to the economic life of the people of every community where it operates a Store.

At this milepost in our history, we pause only long enough to express our thanks to the great American people for their continued confidence and appreciation of our efforts in their behalf and to offer the assurance that in the future as in the past we shall strive to serve not only well but better and better with each succeeding business day.

OUR ANNIVERSARY CELEBRATION BEGINS APRIL FIRST!

WRITE TODAY FOR
"THE STORE NEWS"
beautifully illustrated by
photogravure, showing you
how to save large sums on
Dry Goods, Clothing, Furnishings, Shoes and kindred
lines—standard quality
goods! A post-card will
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WANTED
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Managers, providing for
the continuous growth of
our Company and especially
the expansion planned for 1927. Write for particulars.

The following table shows the imports of fresh fruits by Germany in 1925 and the average yearly imports during 1909-13, together with the percentage of each fruit imported:

Yellow Spanish Cherry

By Mary Sue Chiles

WE HAVE in our yard a yellow Spanish cherry tree over 40 years old, and although it is broken and bent, the children of two generations have played among its branches. It continues to bear fruit each season. It was an immense tree in its best days, being tall and broad and as big as a very large apple tree. In the flowering season it is a mass of beautiful white blossoms, forming a huge bouquet that reaches high into the sky, being admired by all who pass that way. When the fruit is ripe, it is relished by all members of the family.

The tree is valuable both for ornamental purposes and for fruiting. As stated, it reaches at times an unusually large size. The leaves are long and dark green. The flowers are large, bloom in huge clusters and are quite fragrant. The fruit is much bigger than that of the ordinary cherry. When ripe, it has a lovely

golden yellow color with a decided blush on its cheek.

THE FRUIT frost service of the United States Weather Bureau covers eight districts in which data are being obtained on the extent of orchard heating. In the Redlands-San Bernardino district of southern California there are 29,691 acres of citrus trees. More than 5700 acres, or 19.5 per cent, are equipped with heaters. The increase in the protected area since 1923 is 2977 acres. On the basis of 50 heaters of nine-gallon capacity to the acre, a total of 2,483,550 gallons of oil or about 250 carloads are required for one filling of the heaters.

The weather bureau experts located in the various areas give recommendations to growers not only as to the time when the heaters should be lighted but also as to the time that there is no need of lighting the heaters. Through the prediction of rises in temperature, the experts have often been able to save growers hundreds of gallons of oil.



If Your Trees Sprouted Silver Dollars

You'd See That No Pests Blighted Them

IT is chiefly a matter of your "mix"—your Lime Sulphur for scale control at your dormant spray, or your Bordeaux in the Spring. There's none like GRASSELLI GRADE.

And as for Lead, the famous Apple Growers Association of Hood River, Oregon, writes us—"We have used Grasselli Arsenate of Lead continuously for more than 15 years. Its continued use is evidence itself that results have been satisfactory."

GRASSELLI Spray Products are made with one, and only one, consideration in mind:—to eliminate experiment and give the best return to the user.

In every fruit-growing and farming section, you will find a distributor for GRASSELLI GRADE—

Arsenate of Lead • Calcium Arsenate • Lime Sulphur
Bordeaux Mixture • Casein Spreader

THE GRASSELLI CHEMICAL CO. • Cleveland, Ohio

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Saves Poultry and Live Stock

HAD this fire spread, the entire property of a farm might have been destroyed.

"From my kitchen window I saw smoke coming from our poultry house. I ran to it with the *Pyrene* Fire Extinguisher that is always in my kitchen, just in time to put out the fire before it destroyed the poultry and the live stock in the adjoining barns."

Women who often spend days alone in their homes should never be left unprotected against fire. Always have an improved *Pyrene* Fire Extinguisher ready for their use.



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KILLS FIRE—SAVES LIFE

PYRENE MANUFACTURING CO., Newark, N.J.
Write for free booklet "Safeguarding the Farm against Fire"

KINKADE GARDEN TRACTOR
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A Practical, Proven Power Cultivator for Gardeners, Suburbanites, Truckers, Florists, Nurserymen, Fruit Growers, County Estates and Poultrymen
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No 145
ANGLE SPRAY ROD

Combines best features of spray gun and bamboo rod, enabling you to reach every part of a full grown tree with a fine mist spray, and at the same time gain speed and capacity of a large spray gun.

With the No. 145 Angle Rod you can reach the under side of trees, use a for spray at short distances and even break up the spray at the long position.

Light—Easy to Handle

5 1/2 feet long with a 40° angle at the nozzle end. Made of brass throughout. Weights only 3 1/2 pounds. Operator has positive control of spray mist. Saves as much as 25% in spray material—decreases labor—increases speed.

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No. 145 Angle Spray Gun sells for only \$11.00 postpaid. Satisfaction is guaranteed. Try it for one week—if you do not think it is worth more than you have paid for it, send it back and we will return your money. Mail your check (or money order) now.

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Lafayette South
Side Bank or Dun's

Inarching Against Collar Rot

By C. L. Burkholder
Purdue University

THE GRIMES GOLDEN apple has been heavily planted for many years. It is a variety that is especially popular for home use and local trade. Unfortunately, the tree has one bad fault. It is very susceptible to collar rot, or the dying of a section of bark around the base of the tree. This area may extend nearly to the main branches. It can be checked somewhat by cutting away the dead bark to live tissue. In most cases, a collar of bark dies entirely around the base of the tree in a few years.

The best protection against this weakness of the Grimes tree is to plant double-worked trees. On such trees, a Grimes bud is inserted about 15 inches above the ground on some other resistant variety in the nursery row. However, practically all of the present bearing acreage of Grimes was planted before this method of propagation was started. These bearing trees are often valued at \$50 to \$100 each.

Under such conditions, it certainly would pay to spend some money and time in saving the trees. It is rarely possible to bridge graft successfully, as the area of dead bark usually ex-

tends below the surface of the ground and tends to spread more readily there than above ground. Inarching with young one-year apple trees seems to be the best method of supplying the top of the tree with food. The young trees should be planted in the fall or early spring and mulched heavily with manure as soon as planted. In June, or as soon as the bark peels easily, inarch the tops of the young trees well above the rot area. This is done by slicing out a strip of bark on the old tree as wide as the top of the young whip. Cut away a slice of bark two or three inches long on the under side of the whip, and lay it into the opening on the old tree. Fasten it firmly in place with three small nails. It is best to grease the nails before driving them through the whip. Cover carefully with grafting wax and examine frequently to prevent flat-headed borers from working into the area about the union. In most sections, the latter precaution is important. Do not cut off the tip of the whip until the following spring, or it will usually fail to unite with the old tree, and the tip will die down to below the inarch.



Left.—A 25-year-old Grimes seriously infected with collar rot. One-year-old apple whips have been planted around the base and the tops have been inarched into the old tree. Right.—The same tree four years later. Three of the four inarches were successful and have saved at least half of the tree from death.

Controlling Raspberry Diseases

THE TWO most serious diseases of the raspberry and blackberry in Virginia are cane blight and anthracnose, the former being confined entirely in its attack to raspberries while the latter may attack both raspberry and blackberry bushes. Why do raspberry canes turn brown and the berries dry up before ripening? This question is frequently asked during the growing season. In some cases it may be due to hot sun and drought, since berries are natural lovers of cool and rather shaded situations. On the other hand, much of the premature dying out of bearing canes is due to raspberry cane blight, a fungous disease and very troublesome in many fields. The fungous parasite attacks the canes through wounds and frequently enters at the cut where the canes have been pinched off or topped. The disease usually is found extending down one side of the cane, and in the case of young canes it is manifested by a dark discoloration which

from a small area gradually increases until the whole cane is often involved. Cane blight is very severe on black raspberries, but it may also cause much damage to red varieties.

The fungus causing cane blight produces its spores on old dead canes, hence the removal of diseased canes will help greatly in the prevention of new infections on young shoots. Spraying has never given satisfactory control. Removing and burning old canes is practically the only way of checking this disease. This should be done just after the picking season and in the spring. Do not, however, remove old canes and top the new ones at the same time, since alternate cutting of diseased and healthy canes may cause infection in the topped shoots. Cut all canes low so as to leave no stubs, as the fungus produces spores on the dead stubs rapidly.

Anthracnose may be controlled by first starting with disease-free plants, followed by clean cultivation and care-

ful pruning before Anthracnose spots of about three inches in diameter become large irregular canes. Enlarged and shortened spreading branches often occur.

To control first practice closely.

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for March, 1927

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ful pruning and by thorough spraying before the opening of blossom buds. Anthracnose appears as small reddish spots on the young canes and leaves about the middle of May. These spots enlarge on the canes, becoming gray to white in the center with raised reddish margins. The spots frequently become so numerous that they cause large irregular whitish patches on the canes. As a result, the canes are weakened and the life of the planting is shortened. The disease very often spreads over the surface of the fruiting branches and stems, thereby causing the fruit to be small, tasteless, and often not ripening.

To control this disease successfully, first procure disease-free plants, practice clean cultivation and spray thoroughly as follows:

1. After two or three leaves have unfolded on the old canes in the spring, using liquid lime-sulphur, one gallon to nine gallons of water.

2. About one week before the blossom buds open, using liquid lime-sulphur, one gallon to 39 gallons of water. Cover the old and new canes thoroughly.

Spraying a planting twice one year (1925) gave excellent results at Blacksburg.

A variety of black raspberry called the Quillen, and originating in Indiana some years ago, is said to have proved quite resistant to anthracnose through four years' observation at the Illinois Experiment Station. The variety is also said to be a promising commercial berry.—*Virginia Extension Division News*.

Cedar Rust Disease of the Apple

By J. T. Bregger

IN SOME sections of the South, cedar rust is a very serious disease, owing to the presence of a great many red cedar trees, and the question has sometimes come up as to whether or not it would be a good plan to top-work some of the susceptible varieties of apples where it is impossible or impractical to cut down the nearby cedar trees. This is a question which depends upon many factors, however, and cannot be answered except in a general way.

Whenever possible, cedar trees should be cut down in the vicinity of apple orchards, as this is the easiest and surest way of destroying all sources of cedar rust infection. As a rule, there should be none of these trees left within a mile of the apple orchard, for infection rarely takes place over greater distances.

It is sometimes impossible to remove all the cedar trees which may harbor the cedar rust disease, and at such times it may be a better policy to top-work the most susceptible varieties. Of the common commercial varieties of apples, York, Northwestern Greening, Ben Davis, Wealthy, Benoni, Rome Beauty and Winter Banana are reported by growers as being the most susceptible to cedar rust. Trees of such varieties may easily be top-worked to more resistant sorts, and this may be the most practical method of combating cedar rust in certain localities. The varieties of apple showing the great resistance to cedar rust and which may be used for top-working the more susceptible varieties are Grimes Golden, Stayman Winesap, Delicious, Yellow Transparent, Yellow Newtown and Wine-sap. Also, in the planting of new orchards in serious cedar rust sections, these more resistant varieties may be used, avoiding in particular the most susceptible varieties, such as York, Rome Beauty and Wealthy.

On a small scale, where the trees are not too numerous, the "cedar balls" from which the apple trees receive their infection, may be removed from the red cedars by hand and burned. This cannot be done in any large way, but in the case of a few dooryard trees, it is sometimes a very desirable method. Of course, the usual spraying program will do much to control this disease, but it is not as dependable as removing the cedar trees.

Spray Calendars

As published in American Fruit Grower for February, 1927, clearly establish the outstanding superiority of Nicotine Sulphate as the accepted nation-wide control for Aphid, Thrip, Leaf Hopper, Psylla, etc. From the Atlantic to the Pacific, these Experiment Station authorities tell growers how and when to use Nicotine Sulphate and Nicotine Dust.

NATION-WIDE APHIS-CONTROL with

Nicotine Sulphate in "Combination Sprays"

Is Recommended

by Experiment Station Authorities
in the Spraying Guides published by
the "American Fruit Grower", as follows:

Spray Schedule for New York.

Spray Calendar: Shenandoah-Cumberland region
(Virginia).

Spraying and Dusting Schedules for Michigan.

Spraying Schedule for New England.

Spray Calendar for the Middle West.

Spray Table for Northern California.

Spraying and Dusting Calendar for Florida.

Orchard Spray Program for the Pacific Northwest.

General Spray Table for the Southwest.

Spraying and Dusting Program for Southeast.

Spraying Calendar for Rocky Mountain Area.

Spray Calendar for Southern California.

Such is the unanimous endorsement of Nicotine Sulphate throughout the United States. This endorsement is based upon experiments in which "BLACK LEAF 40," the world's leading Nicotine Sulphate and Aphid Specific, was used.

Tobacco By-Products & Chemical Corporation

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Louisville, Ky.

"Black Leaf 40"
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Arsenical Injury to Peach

By C. W. Bennett

Michigan Agricultural Experiment Station

DURING the last three years many peach growers in Michigan have had experience with a spray injury which has caused a decided shock to affected trees and greatly reduced the usefulness of a number of orchards. Two young orchards in the southwestern part of the state were so badly injured in 1925 that the owners were intending to dig out the affected trees and replant in 1926. Several older orchards were considerably injured, and many orchards sprayed with arsenicals showed traces of burning of different types.

The most noticeable injury due to arsenicals often comes after the middle of the summer. Attention may be called to the trouble first by the unhealthy appearance of twigs scattered through a tree. The leaves on certain of the new shoots may begin to droop, roll and turn yellow and may later fall. If such twigs are examined more closely, it will be found that there is a dark reddish colored canker at the base of the new growth. This dis-

colored area at first extends only a part of the distance through the bark, but may later discolor the inner bark and other tissue and kill the twig. In some of the twigs other injured areas may occur. These are usually located around the buds and appear as dark spots often about a quarter of an inch long. These spots sometimes kill the buds and the injured surface frequently cracks and gum flow follows. Gum is often found in abundance also on the canker at the base of the new growth. Dark spots around the buds of the young shoots are very common on peach trees interplanted with apples. In spraying the apple trees some of the spray mixture containing arsenicals finds its way to the peach limbs, adheres in greatest quantity around the buds and causes the death of the outer bark.

Injury, however, is not confined to young growth. Decided cankers are produced on the one and two-year-old limbs. These are of a darker reddish color and at first are smooth, but soon the bark begins to crack around the edge and over the surface of the injured spots, finally leading to the production of a very rough surface on

the limb. In the more severe types the bark cracks and there is considerable gum flow. Older limbs may be very much weakened by injury of this kind.

Leaves also are sometimes directly injured by spray containing lead arsenate. Brown spots a quarter of an inch or less in diameter appear; these die and pull away from the surrounding leaf tissue and drop out, leaving a "shot hole" condition. Such leaves in many cases turn yellow and drop.

The fruit is not often injured by contact with spray but brown spots may be found around the base of the fruit attachment. In such cases the peaches are smaller and have a very poor flavor.

A Jew and a Scotchman were brought into the police station.

"What is the charge against them?"

"They are crazy, your honor."

"They don't look crazy to me. What makes you think they are?"

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Rootstock Developments in California

By M. J. Heppner
University of California

FOR SOME years past, the Division of Pomology of the University of California has been carrying on annual surveys among the state nurserymen in order to ascertain the changes as they occur from year to year in the percentages of the various rootstocks used for the different deciduous fruits. The results of these surveys have appeared in the columns of the AMERICAN FRUIT GROWER MAGAZINE from time to time. Below are presented the figures secured from the survey made during the planting season of 1925-26, representing the trees sold by the nurseries during that time and also the figures from the two previous surveys. As would be expected, some marked changes occurred in the demand for some of the rootstocks during the three seasons:

PERCENTAGES OF VARIOUS ROOTSTOCKS USED

	1923	1924	1925
Almond—	1924	1925	1926
Almond	35.9	39.8	53.4
Peach	64.1	60.2	46.6
Apricot—			
Apricot	32.6	45.8	52.9
Myrobalan	13.8	16.2	12.5
Peach	52.3	36.5	34.2
Davidiana	1.3	1.5	0.4
Plum—			
Myrobalan	42.4	40.4	34.2
Peach	49.8	54.5	62.5
Apricot	7.6	4.8	2.6
Almond	0.2	0.3	0.7
Prune—			
Myrobalan	54.5	55.8	63.8
Peach	38.2	32.3	29.5
Apricot	2.9	3.8	2.1
Almond	3.0	6.2	2.3
Davidiana	1.4	1.9	1.3
Peach—			
Peach	98.96	97.6	98.3
Almond	0.28	0.1	0.1
Apricot	0.20	1.2	0.7
Davidiana	0.56	1.2	0.9
Cherries—			
Mazzard	80.3	72.5	59.0
Mahaleb	19.1	15.5	34.8
Morello	0.6	12.0	6.2
Pears—			
Japanese	42.5	51.9	24.2
French	34.4	29.3	29.4
Quince	9.9	4.9	4.9
Calleryana	3.4	1.2
Old Home on Calleryana	9.2	8.3	25.3
Old Home on French	1.4	3.1	12.7
Ussuriensis	2.6	...	2.3

Stocks for Almonds Show Reversal

An inspection of the almond figures shows that there has been a complete reversal in the popularity of the two stocks commonly used, namely, the peach and almond. During the 1923 and 1924 seasons, the peach root appeared to be the favored stock for the almond. However, in the past season, we find that the demand for this root has fallen off, while a corresponding increase has taken place in the demand for the almond root. Why such a complete reversal took place the past season cannot be explained, unless it be that almonds were planted on soils better adapted to the almond root than to the peach root.

Apricot Root Gaining for Apricots

A glance at the figures for the apricot show some marked changes. The apricot root seems to be the favored stock and it seems to be increasing in popularity from year to year. The Myrobalan root lost heavily the past season, the demand being about the same as during the 1923 season. As can be seen, the demand for this stock for the apricot is far less than the demand for the apricot root. While over one-half of the apricots sold in 1923 were on the peach root, only 36.5 per cent were on this root in 1924, and a still less percentage in 1925, namely, 34.2 per cent. Although the apricot works well on the peach root, the writer is of the opinion that it will never hold its present place as one of the favored combinations in view of the attacks of the nematode on the peach root. In all probability, the gradual falling off in the demand for the peach root as the stock for the apricot might be accounted for by the fact that growers are beginning to

realize the hazard of using the peach root in nematode infested areas. Although the peach root has its place, growers will probably be on the right track if they select the apricot root instead of the peach root, especially in soils in which the nematode is known to exist. It will be noticed that the Davidiana or Chinese peach has been represented for the past three years, although to but a very small degree. This stock is one of the most alkali-resistant stocks we have for stone fruits, but as yet it is too early to say just how the apricot is going to do on it. However, there seems to be no reason why it shouldn't be as successful as the common peach stock. Unfortunately, this stock is very susceptible to crown gall. However, this crown gall susceptibility may not prove disastrous, as practically all of our common stocks are subject to its attack.

Two Changes in Plum Stocks

Two distinct changes have occurred in the demand for the plum stocks. First, the demand for plums on Myrobalan root has been gradually decreasing, and second, the demand for plums on peach root has been gradually increasing, due probably to the fact that plums are being planted on the lighter soils. Likewise, the demand for the apricot root has fallen off from year to year. The almond root took a slight jump the past planting season, but it is questionable whether it was a warranted jump, due to the fact that this stock has generally never amounted to much when plums were worked on it. The falling off in the demand for the apricot root seems to be well justified, as it has been shown that the affinity between most plums and the apricot has been very weak. However, certain varieties offer much in the way of a good affinity with this root. Extensive investigations are being carried on by the University of California at the present time along the line of testing the affinity between the apricot root and all varieties of plums used commercially.

Just why the Myrobalan root has been losing in favor during recent years cannot be definitely accounted for. It may be due to the great variation existing in the seedlings. Nurserymen have taken cognizance of this variation and are not attempting to isolate types that show slight variation. At this time, there is a mix-up of innumerable types, many of which seem to be better adapted for root-stock purposes than others.

In the case of the stocks used for the prunes, we note entirely different conditions. For these, the Myrobalan root has been gradually increasing in favor, taking a big jump the past year. On the other hand, the peach root has been falling off in favor from year to year. These conditions are just the opposite to those existing with the plums, for which the Myrobalan is losing and the peach is increasing in favor. The demand for the apricot as a stock for prunes fell off the past season from 3.8 per cent in 1924 to 3.1 per cent in 1925. Little affinity exists between the apricot and most of the prune varieties, and for this reason a relatively small percentage of all the prunes are placed on this root. The sugar has been reported to make a strong union with it, and in other cases the union has not been favorable. This may be accounted for by the variations existing in the apricot stock itself and also in the soils in which the trees have been planted. The French prune seems to be in the same category as the Sugar as far as affinity for the apricot is concerned. The demand for prunes on the almond root fluctuated from three per cent in 1923 to 6.2 per cent in 1924 and then down to 2.3 per cent the past season. Evidently, the Davidiana root is maintaining its favor, but here again time alone can tell just how the

prune is going to behave on it. There appears to be no reason why this stock should be avoided for the prune.

Little Change in Peach Stocks

Little change has occurred in the demand for the stocks used for the peach. Peach on peach still seems to be the favored combination and in all probability will remain as such. A few trees were on the almond root the past season, although it is questionable if the stock should be used for the peach. The apricot root seems to be holding its own as a stock for the peach, although the demand for it is very weak indeed when compared with the demand for the peach root.

Considerable doubt exists as to the affinity between the peach top and the apricot root. Of course, this would be the ideal combination, but there are so many cases on record which show that it is not a safe one that it would pay the prospective buyer of such trees to look carefully into the matter before selecting them. The demand for the apricot root is a natural one from growers located in sections infested with the nematode. Many of the nematode problems facing peach growers in the San Joaquin Valley could, no doubt, be solved if it were possible to get the peach to grow on the apricot, which is highly resistant to the pest. It appears that the most likely method of combating the nematode in peach orchard soils consists in finding another resistant stock upon which the peach can be successfully worked. Soil treatments with chemicals have proved ineffective. Although conditions do not look their best for the apricot root at the present time, on account of the apparent lack of congeniality, the writer has hopes that this problem will soon be solved either by changes in methods of budding or through the medium of double-working. Here another problem enters, namely, the necessity of finding some species that works successfully on the apricot and on which the peach can be worked. Although double-worked trees will be slightly more expensive than regular single-budded trees, the increase in price of trees will be more than offset by the increased returns when the trees come into fruiting. The Davidiana seems to be coming along nicely as a stock for the peach. Old peach trees on this root are in the best of condition despite the fact that the soil is highly alkaline. There is no doubt but that the Davidiana has its place as a stock for the peach.

Demand for Mazzard Roots Decreasing

Ever since cherries were grown in California, the Mazzard root has been the favored stock. However, this is not because it is the best stock, as it has fallen down time after time, but because "Mazzard" has been handed down from one generation to another. There is no doubt but that it is a stock well suited for a particular set of conditions, but the trouble with it is that there seems to be no uniform type. At one time, the true wild Mazzard was the predominating stock, but the demand soon exceeded the supply with the result that most of the Mazzard seeds of today are nothing other than seeds of various sweet cherries. Some day it may be possible to get a source of supply of the true wild Mazzard, but up to that time growers will have to be satisfied with the stock available, which is a very mixed-up affair.

On the other hand, the Mahaleb root has always been the stock in least demand in California, although there are other sections of the country in which its demand far exceeds that of the Mazzard. There are many orchards in California in which the Mahaleb is giving far better results than trees on the Mazzard growing under similar conditions. The Maz-

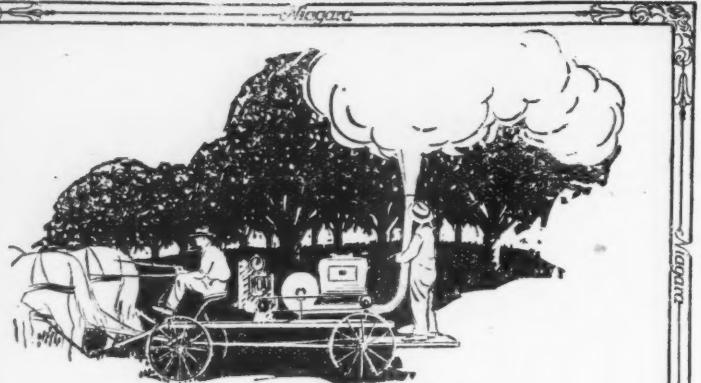
zard is and for growth in similar soil. Of course, too large. Although the Mazzard in 1923 and for the season, Mazzard off, which took a son, for the mandible. Stock results stock to be other, it is a characteristic much cherries. As pears, The J. vored of ye position out-district French the m. current year has c. during begin offers of this table. lieved was semi Howe occurs blight Japanably, blight many as a condition poor the F. these gathered made been abrupt in the Japan. And changes roots favor pear stock the p. in well show terist good much shoul that sufficie dition is no shoul our draw of a new It ce of these first serv herald indu nee. The table is in year chal

Standard and Dilute Sprays in Apple Scab Prevention

By F. H. Ballou and I. P. Lewis

Ohio Agricultural Experiment Station

IN THE February issue of the American Fruit Grower Magazine, the writers presented results from experiments conducted in Ohio on the control of apple blotch by dilute spray materials. As described in that article, the results from the use of dilute sprays were quite favorable. In the present article an account is given of a similar series of experiments conducted in connection with apple scab.



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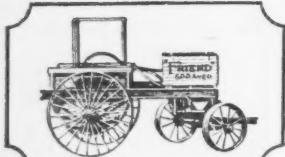


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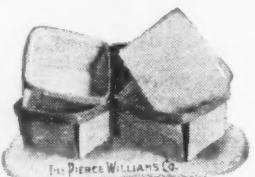
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OUR SPRAYING experiments in the prevention of apple scab by spraying began in 1922 and closed with the season of 1926. An orchard of Rome Beauty trees 30 years of age was chosen for this work at Carpenter, Meigs county, 30 or 40 miles distant from the one in which apple blotch was the subject of our attention. Both the foliage and the fruit of this orchard had been seriously affected by scab for a number of years. The severity of infection may be judged from the fact that the "check" trees, for the first three years of the experiment, averaged but six-tenths of one per cent of perfectly scab-free fruit per year.

The primary object in beginning this particular experiment was to make a careful and critical comparison of standard Bordeaux mixture and commercial lime-sulphur solution as sprays for combating the ever prevalent and destructive disease of scab. At the outset, the orchard was divided into but few plots; but the surprising results obtained from the various formulas of dilute Bordeaux mixture

in our first year of work in scab prevention in Washington county induced us to include dilute sprays in our scab prevention tests in this old Rome orchard at Carpenter. Therefore, in the second season (1923), we subdivided the larger plots, obtaining over 20 smaller ones, which, nevertheless, were of generous size and well adapted to our proposed experiments. Many spray formulas were tested in this project over the five-year period was terminated; for, as in our scab control work, we were urged by various individuals and firms to include new sprays and variously revised formulas.

As in the presentation of results from spraying for blotch, we are presenting below, in condensed form, the more important features of even a greater mass of data which accumulated during the five years of intensely interesting work in scab control. In this table the time schedules for the different applications of spray are so clearly indicated that further particulars are unnecessary.

RESULTS OF SPRAYING TO CONTROL APPLE SCAB, 1922-26.
CONDENSED SUMMARY.

	Pink spray.	Open calyx spray.	Two-weeks' spray.	Ten-weeks' spray.	Years each formula has been used.	Average wholly free from scab.	Per cent.
No. 1.....	Bordeaux. 1-9-50 1-9-50 2-6-50 1-3-50 1-5-50 1-5-50	Bordeaux. 1-3-50 3/4-2 1/4-50 3/4-2 1/4-50 1-3-50 1-5-50 3/4-2 1/4-50	Bordeaux. 1-3-50 3/4-2 1/4-50 3/4-2 1/4-50 1-3-50 1-5-50 3/4-2 1/4-50	Bordeaux. 1-3-50 3/4-2 1/4-50 3/4-2 1/4-50 1-3-50 1-5-50 3/4-2 1/4-50	1923-24-25-26 1923-24-25-26 1923-24-25-26 1925 1923-24-25-26 1923-24-25-26	72.7 89.4 78.8 93.6 88.9 88.9	
	Lime-sulphur solution.						
No. 2.....	Bordeaux. 3-9-50 3-5-50 3-9-50 2-6-50 2-6-50 2-6-50	1-40 1-40 1-40 1-10 1-10 1-10	3-9-50 3-5-50 1-3-50 2-6-50 1-3-50 3/4-2 1/4-50	Bordeaux. 3-9-50 3-5-50 1-3-50 2-6-50 1-3-50 3/4-2 1/4-50	1922-23-24-25-26 1922-24 1922-23-24-25-26 1925-26 1925-26 1923-24	83.9 87.3 92.2 95.1 91.5 80.9	
	Hydrated lime.						
No. 3.....	Bordeaux. 3-9-50	9-50	9-50	9-50	1923-24	69.4	
No. 4.....	Check plot	No spraying			1922-23-24-25-26	10.04	
	Lime-sulphur solution.						
No. 5.....	1-2-50 1-3-50 1-4-50	1-40 1-40 1-80	1-40 1-40 1-80	1-40 1-40 1-80	1922-23-24-25 1922-23-24-25-26 1925-26	84.7 91.9 97.0	
	Try lime-sulphur.						
No. 6.....	5-50 5-50 4-50	4-50 2-50 3-50	4-50 2-50 3-50	4-50 2-50 3-50	1923-24-25 1925-26 1925-26	91.1 92.7 96.5	
	Hydrated lime.						
No. 7.....	5-50	9-50	9-50	9-50	1923-24-25	69.3	
	Lime-sulphur solution.						
No. 8.....	1-40	9-50	9-50	9-50	1926	97.4	
	Hydrated lime.						
No. 9.....	2-6-50	1-200	1-200	1-200	1923-24-25-26	61.9	
	Colloidal sulphur.						
No. 10.....	5-50	5-50	5-50	5-50	1924-25-26	86.2	
	Sulfocide.						
No. 11.....	1-200	1-200	1-200	1-200	1925-26	91.5	

No. 1. In group No. 1 of the table are presented the results in percentages of scab-free apples, from the use of Bordeaux sprays of widely varying strengths. And yet, just as in the case of the variously modified copper-lime sprays in blotch control, the results in disease-free fruit are as uniform as if sprays of the same strength had been used on all the plots of this section. The more concentrated of these Bordeaux formulas gave not only much foliage injury but more or less russeting of fruit because of the Bordeaux being used both in the "pink" and the "petal-fall" applications.

No. 2. Group No. 2 gives the record of scab control from the use of different

formulas of Bordeaux in which the usual practice of spraying with lime-sulphur at the petal-fall period was observed. Here, again, the results in percentages of scab-free fruit, on the whole, are as uniform as if all the plots had been treated with the same mixture.

No. 3. This record shows returns from the use of the standard Bordeaux formula in the pink of fruit buds and of lime only (and arsenate of lead, of course) during the remainder of the spraying season. These figures should be compared with those in Nos. 7, 8 and 9.

No. 4. This is the "check" plot, and the figures suggest the serious infection by apple scab that was in the orchard in which we were combating this disease. During the first three years of this experiment, the check plot gave an average of only six-tenths of one per cent (0.6) of fruit free from scab.

In this connection, it is appropriate to state that we have found the effects of thorough spraying cumulative in a considerable measure. Unless there be neglected, diseased trees or orchards nearby, an orchard that is carefully and faithfully sprayed each successive season can be more and more readily kept free from fungous diseases. But a few neglected trees, or a poorly sprayed orchard to the windward, is a constant and dangerous menace to the orchard in which thorough spraying is done, as such a situation renders disease control much more difficult. We have abundant evidence that this is true.

Nos. 5 and 6. Here, again, is demonstrated the truth that commercial lime-sulphur solution and dry lime-sulphur (or the powdered form) sprays are even more effective in scab control than are the Bordeaux mixtures, while injury to foliage and fruit is very much less where the lime-sulphur sprays are employed. We are finding the dry lime-sulphur preferable in the latter respect.

No. 7. It will be noted that where dry lime-sulphur 5-50 was used in the pink application and only hydrated lime (with arsenate of lead) for the remainder of the season, the percentage of sound fruit was almost exactly the same as for the formula given in No. 3, in which Bordeaux 3-9-50 was used in the pink. There was considerable russetting of fruit from the Bordeaux-hydrated lime program but none from the dry lime-sulphur-hydrated lime formula.

No. 8. This group simply but clearly demonstrates that when fungous diseases have been practically eliminated from an orchard by successive years of thorough spraying, and with no seriously infected orchards or trees nearby, a lime-sulphur-hydrated lime program will give excellent results. By the use of either the lime-sulphur solution or dry lime-sulphur as a spray in the pink, and hydrated lime for the successive applications (with arsenate of lead, of course), we have a very excellent spraying program for such scab-resistant varieties as Grimes and Jonathan apples. And this schedule gives fruit of exceedingly fine finish.

Here, again, is evidence of the good results of thorough spraying with mild sprays; but the orchardist who is not willing to do his work carefully and faithfully should not attempt to use the very dilute sprays. He would better just continue to "putter around" and squirt his more dangerous and expensive spray solutions on the trees in sprinkles, splashes and patches and depend, as in the past, upon the rains to dilute and distribute his fungicides and insecticides. We have known careless sprayers who, at the end of 25 years of experience, were doing just as poor, ineffective spraying with good equipment and expensive materials as they ever did in the past.

No. 9. This demonstrates that in the scab prevention tests as well as in those directed against blotch, lime itself does exert a well-defined fungicidal effect. In the years 1925-26, the lime plots in these experiments produced surprisingly high percentages of scab-free apples. But the different brands of hydrated or "finishing" lime on the market are quite variable in quality and freshness. Also, lime alone lacks adhesive qualities as compared with copper-lime or sulphur-lime combinations. We are not advising orchardists to use lime alone as a spray—at least not until more is definitely known of the merits of the different brands.

Nos. 10 and 11. Colloidal sulphur is a safe and pleasant spray to apply and in the past season has given better results than the clearly inferior grades at first used. Up to the present time, it has not been quite so efficient in scab prevention as the lime-sulphur sprays.

Sulfocide has given good control of scab when used in connection with Kayso (which the manufacturer explicitly advises when arsenate of lead is added to the spray). We noted quite a little evidence of foliage injury, however, from the summer sprays. As in the case of the blotch prevention work, this highly concentrated spray gave fruit of fine color and finish. It is used at the rate of one gallon to 200 gallons of water, or one quart to 50 gallons.

Conclusion

The senior author of this article, deeply impressed with the evidence of excellent results from use of unusually dilute sprays at the outset of this five year series of spraying experiments under his personal supervision, promptly adopted a definite spraying program for his own apple orchard of 20 acres. In this orchard, the foliage and fruit of the varieties more susceptible to scab, such as red Delicious, Stayman and Rome, for a number of years previous had been rather seriously infected with this disease. A new orchard manager was employed and a new spraying program inaugurated, simultaneously. Four years have passed under this new regime, and apple scab apparently has been almost entirely eliminated. The foliage has been luxuriant, clean and healthy, while the fruit has not only been exceptionally free from scab, but exceedingly smooth and glossy in finish. Our spray program is a dry lime-sulphur-hydrated lime combination, and so successful has it proved under our thorough system of spraying that it has been adopted in many other orchards in Ohio. The schedule and formula are as follows:

For the "pink of buds" application:

Dry lime-sulphur...3 lb. to 50 gal. of Hydrated lime.....5 lb. water.
For the petal-fall, two, four and 10-weeks applications:

Dry lime-sulphur...1½ lb. to 50 gal. of Hydrated lime.....5 lb. water.
Arsenate of lead...1¼ lb.

We shall continue to use this spraying program until one is discovered that is better for our purpose. We do not urge anyone to use it unless he is willing to do as thorough and timely spraying as we practice. Properly applied, this formula fills our present needs most admirably.

However, materials, methods and means for combating fungous diseases at this time are undergoing such a rapid transition as compared with developments during the past 10 years or more, that we venture no prediction of what the next few years will bring about. Our motto or slogan will continue to be, as in the past, "Don't marry or adopt some particular method or material or equipment in orchard practice," to the exclusion of newer and better means of performing orchard operations. Let us keep our eyes and minds open for improvements and make use of the better of these until something still better develops.

Tennessee Horticulturists Hold Successful Meeting

G. M. BENTLEY, secretary-treasurer of the Tennessee State Horticultural Society, reports that the joint meetings of the Tennessee State Horticultural Society, the Tennessee State Nurserymen's Association and the Tennessee Beekeepers' Association, held on January 18-21 at Nashville, were a distinct success from every standpoint.

The horticultural program was well balanced and included addresses by prominent authorities. The speakers included L. J. Baskin of Tennessee, W. S. Campfield of Virginia, S. N. Varnell of Tennessee, G. M. Gay of Georgia, Homer Hancock of Tennessee, Oliver Grimes of Kentucky, C. J. Haden of Alabama, Paul Stark of Missouri, W. C. Pelton of Tennessee, A. J. Ackerman of Arkansas, A. J.

Gunderson of Ohio, E. W. Stillman of the United States Bureau of Agricultural Economics, and George E. Murrell of Washington, D. C.

A large apple show was staged in the lobby of the Hotel Hermitage. The fruit was exhibited in boxes, the variety names and parts of the state from which the apples came being indicated by labels. The exhibit was arranged in the form of a map of the state and showed the varieties that did best in the different parts of Tennessee. The exhibit attracted the attention not only of the growers in attendance but also of tourists, salesmen and members of the Tennessee legislature, which is now in session.

A barbecue and orchard demonstration were conducted on the 65-acre fruit farm of W. H. Armstead of An-

glewood. The barbecue was carried out in true old-fashioned southern style, and the demonstration consisted of pruning and spraying.

The officers elected for the three associations are as follows: Tennessee State Horticultural Society: president D. E. Hodges, Chattanooga, Tenn.; vice-president for east Tennessee, J. A. Parker, Kingston, Tenn.; vice-president for middle Tennessee, Fleming Rainey, Columbia, Tenn.; vice-president for west Tennessee, N. B. White, Oakfield, Tenn. Tennessee State Nurserymen's Association: president, D. P. Henegar, McMinnville, Tenn.; vice-president for east Tennessee, A. J. Fletcher, Jr., Cleveland, Tenn.; vice-president for west Tennessee, T. C. Word, Union City, Tenn. Tennessee State Beekeepers' Association: president, J. M. Buchanan, Franklin, Tenn.; vice-president, D. E. Scott, Caney Springs, Tenn.; general secretary and treasurer, G. M. Bentley, Knoxville, Tenn.

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Variation in Rootstocks

By J. L. Collins

University of California

A FREQUENT source of permanent difference in yield of fruit trees is found in the variations in the seedling rootstocks used in propagating the trees. Until very recently little attention has been given by propagators of trees to this source of variability.

The writer addressed inquiries to associations of nurserymen in New England, Minnesota, Missouri and Washington, to learn if they were giving consideration to the variability in the seedlings used as stocks for budding and grafting. The nature of the replies were negative in all cases. Some were desirous of obtaining seedlings more resistant to various diseases and climatic conditions, but were not concerned about the hereditary differences in growth and vigor existing among the individual seedlings.

At the present time, it is estimated that about 90 per cent of the apple and pear used in this country for rootstocks are propagated in the Kaw River Valley, near Topeka, Kan. Practically all the seeds used for growing these seedlings are imported from France and Japan under the name of French crab. Little is known about the type of trees from which these seeds come.

After one season's growth, the seedlings are removed from the ground, graded according to size, which usually ranges in trunk diameter from one-fourth inch, three-sixteenths inch, two-sixteenths inch to one and one-half-sixteenths inch, and sold according to size. Now what causes these seedlings to vary in size? They all have an equal chance for growth in the seed bed and nursery row. It is the same thing that causes some men to grow tall and strong and others to remain small and relatively less strong, and that is heredity.

How will these differences in size of seedling rootstocks affect the trees which ultimately reach the orchard? Fortunately, this question can be answered in the results of a demonstration.

The director of the Citrus Experiment Station at Riverside, Calif., selected large, medium and small sized nursery seedlings, which were budded to varieties of orange, lemon and grapefruit. These budded trees were planted in alternate rows in the orchard. After several years, the trees still showed definitely the original size relations of the seedling rootstocks, and, moreover, the buds placed on the large seedlings came into bearing two years earlier than those placed on the roots of the small seedlings. Buds placed on small, slow-growing seedlings are now supposed often to be the cause of dwarfish, late-maturing and unprofitable trees in the orchard. Such trees can be prevented from ever reaching the orchard if as much care were exercised in selecting the right rootstock as is used in selecting the right kind of buds or scions. In this regard, the director of the Citrus Experiment Station suggests that:

"We must no longer grow merely sour stock or sweet stock and the like. The process must be carried farther and good stock varieties of sour orange and sweet orange must be discovered and named as stock varieties and every nurseryman should then use seeds from these varieties known to produce good stock seedlings."

The same can well be said regarding the production of stocks for apples and pears. Macoun, working in Canada, and Dorsey, in Minnesota, found that seedlings of the Northern Spy and Malinda apple consisted of a number of different types, many of which were dwarfish and sluggish in growth, a generally undesirable type for rootstock purposes.

One fact stands out clearly as a result of these researches and that is that the vigor and growth of orchard trees is largely dependent upon the type of roots upon which it grows, and to obtain uniform vigorous trees, only large, vigorous seedling trees should be used for grafting and budding.

It is evident that bud sports play a relatively small part in producing the variation in the productivity of individual trees of an orchard of the same variety. Individual trees showing an average production noticeably above that of other trees of the variety are seldom able to transmit this characteristic of higher production to other trees through its buds.

Nurserymen should recognize the importance of more careful selection of stocks, and the fruit grower for the production of efficient orchards should consider yields on the basis of individual tree production rather than on the per acre basis.

Trapping Rabbits

By Jack L. Baker

LAST winter my brother rid our orchard of dozens of cottontails which were causing serious damage. Incidentally, his operations were profitable, since he sold the dead bunnies at good prices.

He used traps made of ordinary boxes about three feet square. These were sunk in the ground to a depth of about two feet. On opposite sides near the top, holes about six inches square were cut in the boxes. Into these holes small boxes about one foot long and six inches deep were set and pivoted so that when Mr. Rabbit entered to partake of the cabbage hanging from the top of the box, he would fall in the big box and be trapped there.

My brother fitted the top of the box with a hinged door so that the rabbits could be removed easily.

The diagram presented below shows a cross section of the trap plunged in the ground.

THE AMERICAN Railway Association reports that due to the efforts of railroads and shippers during the past five years, the annual loss and damage bill of carriers has been reduced from \$120,000,000 to less than \$40,000,000. Plans were discussed at the recent convention of the Freight Claim Division of the American Railway Association at Norfolk, Va., with the object of further reducing the bill.

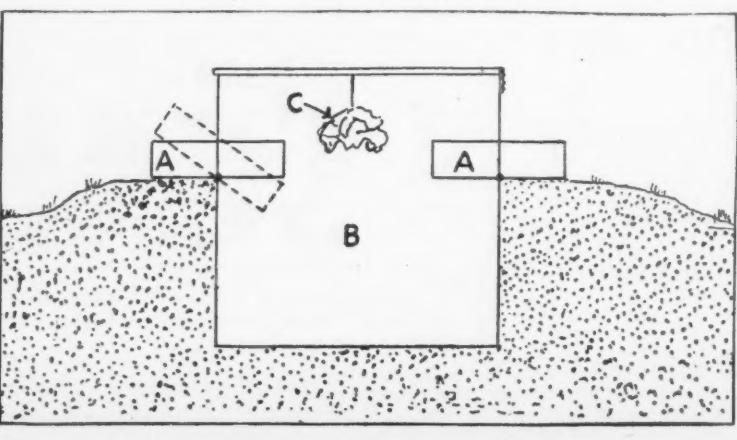
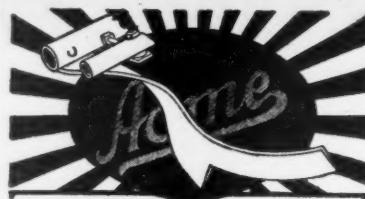


Diagram of rabbit trap ready for action. A box (B) with a hinged cover is plunged into the soil. The rabbits enter through tunnels A, which tilt, as shown by the dotted lines. The bait (C) is hung from the top of the box.



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XUM

Some Tendencies in Grape Pruning

(Continued from page 3)

defoliation, no wood being removed. From another pair of vines, every shoot was removed immediately beyond the last cluster of fruit, leaving only approximately as many leaves as there were clusters of fruit. The third treatment consisted in the removal of the shoots beyond the fourth

from the standpoint of either fruit quality or effect on the vine for succeeding crops.

General Pruning Recommendations

The four arm Kniffin system (or closely related forms) of pruning is almost universally accepted as the

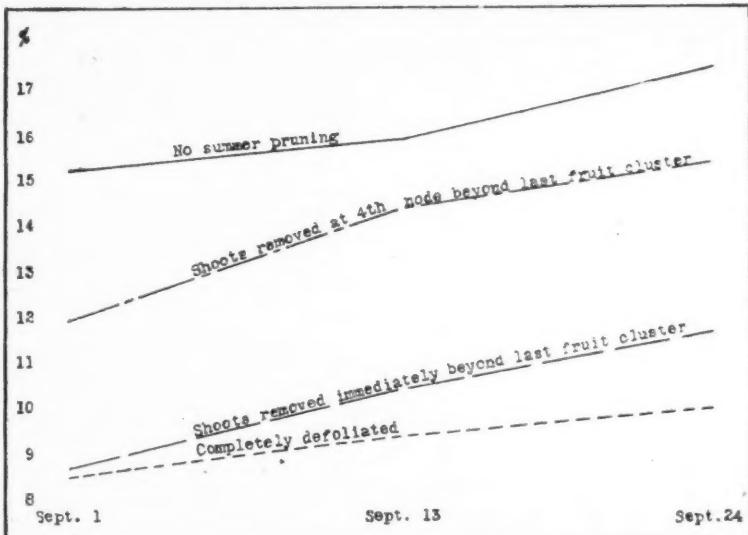
TABLE SHOWING EFFECTS OF SUMMER PRUNING ON SUGAR CONTENT OF CONCORD GRAPES

	Saccharimeter Reading— (Per cent)		
	Sept. 1.	Sept. 13.	Sept. 24.
No summer pruning	13.38	16.06	17.38
Shoots removed at fourth node	12.13	14.50	15.44
Shoots removed at last fruit cluster	8.81	10.50	11.75
Completely defoliated	8.63	10.00	9.38

node from the last cluster of fruit. The last mentioned treatment is at times approached in commercial practice.

As soon as fruit on normal vines began to ripen, effects of the summer pruning were noticeable. All vines from which leaves or wood had been removed during the growing season

most satisfactory for commercial purposes. In this system, the vine is trained to a single upright trunk supported by a two-wire trellis. The bearing wood consists of four canes, one trained each way on each wire. At each dormant pruning, new canes, arising from points as near the trunk as possible, are chosen to replace the



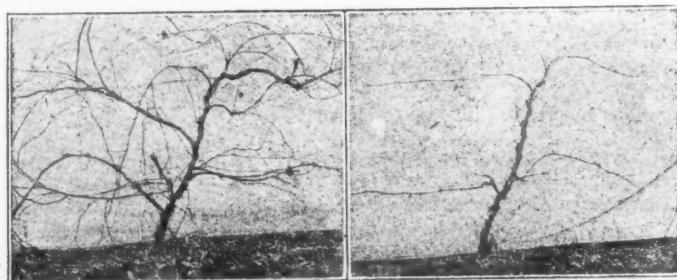
Graph showing the effect of summer pruning of Concord grapevines on the relative sugar content of expressed fruit juice. It is apparent that summer pruning of all forms studied was harmful to quality in the Concord

showed signs of uneven ripening or complete failure to ripen. The more severe the treatment, the more pronounced were these tendencies. Although the fruit on vines from which shoots were cut at the fourth node from the last fruit cluster attained sufficient sugar for dessert purposes, the sugar content was considerably below the sugar content of fruit from vines receiving no pruning. Fruit from vines of the other two treatments were very low in sugar content and were inedible as long as sugar determinations were run. It is of interest to note, however, that by November 1, two and one-half months after the normal ripening season, much of the fruit on both these treatments was still hanging and most of it had turned purple. The quality was not high, but the fruit was edible.

Some growers may try to use summer pruning as a means of producing late fruit. It may have possibilities, but I do not recommend such practices

old ones. The length of cane to leave must be determined by vine vigor—the greater the vigor, the more fruiting wood the vine can support, and vice versa. The ideal cane of the Concord is one-fourth inch in diameter or larger and has joints approximately five inches apart. In addition to the above canes, four spurs bearing two or three spurs each should be left near the base of each cane. These are called renewal spurs, and although they often bear fruit, their main function is to supply desirable canes suitably located for the following year. It should always be the endeavor of the pruner to replace aged wood with young wood.

There are about 33,000,000 people in the United States who make their living by producing farm products, and there are about 19,000,000 who make their living by helping to market these products.



A mature grapevine before and after pruning, trained to the Kniffin system. Note the four canes and the four renewal spurs, one near the base of each cane. These renewal spurs insure well placed canes for the following year



Rural electrification —a fact on more than 260,000 farms

AS the result of cooperative investigation carried on in twenty states, electric light and power companies are now building rural lines as fast as circumstances will permit.

On 260,000 farms rural electric service is in successful operation today.

The same force which has done so much for industry will soon be available to an increasing number of farms.

The resources and experience of more than forty years of successful city service are back of this movement to bring the farmer the greatest practical help he has ever had.

With the desire to make full

use of all the benefits of electric service, and with the development of new equipment, rural electrification will open a new era on the farm.

Rural lines cannot be built everywhere at once, but the light and power companies are ready to extend service to groups of farmers, which together, can use sufficient power to justify the building and maintaining of rural lines.

Rural electrification can come quickly—where farmers and the light and power companies work together for the same good end. Ask your power company for information and cooperation.

The Committee on Relation of Electricity to Agriculture is composed of economists and engineers representing the U. S. Departments of Agriculture, Commerce and the Interior, American Farm Bureau Federation, National Grange, American Society of Agricultural Engineers, Individual Plant Manufacturers, General Federation of Women's Clubs, American Home Economics Association, National Association of Farm Equipment Manufacturers, and the National Electric Light Association.

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THE STAYMAN apple tree is a very vigorous grower in its early years and usually sets heavy crops of fruit. According to Prof. M. A. Blake of the New Jersey Agricultural Experiment Station, the trees therefore tend to show decreased vigor soon after they come into full bearing. Furthermore, the fruit is commonly deficient in size, color and finish.

In view of these conditions, Prof. Blake advises that growers of Stayman apples pay particular attention

to fertilizing of this variety so that the trees may be maintained in a vigorously growing condition, as well as to proper pruning.

Just to Do Something

Dentist's Wife—We must give the maid a little treat of some sort for her birthday.

Dentist—All right. I'll extract some of her teeth free.—Nagels Lustige Welt, Berlin.

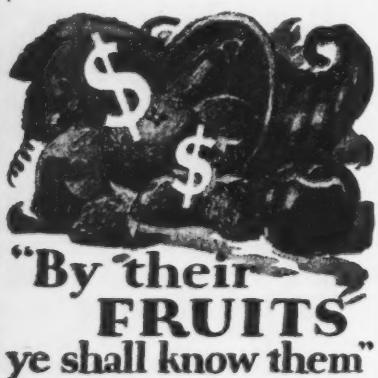


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L&N

Engineering for the Fruit Grower

By E. W. Lehmann

Better Farm Home Lighting

THERE are very few homes that are properly lighted, even where electricity is available. The importance of proper lighting is being recognized in the improvement of our school buildings. It is equally important that it be given attention in the home. After all, the measure of illumination is how the light helps one to see. Under some conditions and in certain rooms more light is needed than under other conditions; therefore, special consideration must be given to the need of lighting. The intensity of lighting any area or surface is dependent on the need of light to see.

In the farm home, the need of good lighting is felt especially in the dining room, also in the living room, when several try to read seated around an inadequate light. The intensity of the lights provided in the bedrooms and halls does not have to be as great, since these rooms are not considered as working areas. In every case, sufficient light should be provided to avoid eye strain. While most lighting troubles can be charged up to dim lights or lights of low intensities, there are also examples of lights being too bright.

The need of better lighting is felt especially during the winter months. The evenings are longer and the children have lessons to prepare, and everyone else has more time for reading. There is also a greater need of good lighting outside the house where many chores must be done after dark.

Improvements in Lighting Equipment

Many improvements have been made in equipment in recent years for farm house lighting. Much better individual lamps are now on the market than formerly. These include improved kerosene lamps of the mantle type which really light a room. The gasoline mantle lamps are another inexpensive kind used in many farm homes where the owner has not seen fit to install electric or some type of gas plant. There is little question but that the most nearly ideal form of lighting is by means of electricity, when we consider the matter of convenience, safety, beauty, economy and its capacity to actually illuminate. The development of the small unit electric plant, and the rapid extension of electric power lines, have put electricity as a source of light and power at the command of all rural dwellers.

Three Classes of Lighting

There are three classes of lighting in use, the direct, the indirect and the semi-indirect. With direct lighting, all of the lighting from the source is thrown downward, and any light which strikes the ceiling is reflected light. The early method of lighting by electricity was this class of lighting. Usually a drop cord was installed in the center of the room with one socket provided with an opaque reflecting shade. Such a method of lighting is not satisfactory.

The indirect method of lighting consists in providing opaque reflectors to throw the light to the ceiling, from which it is reflected as general illumination to the entire room. This method of lighting is better than the direct from the standpoint of glare, but it is a very inefficient method if the ceiling and walls are dark.

The semi-indirect method is the best of the three and is more commonly used. The reflector is similar to that used in the indirect, but it is made of a material which allows some of the light to pass through it without being reflected from the ceiling. Such a reflector diffuses the light, prevents glare, and also to a large extent prevents shadows, which is indicative of good illumination.

In house lighting as well as in industrial lighting, we also have lighting

classified as general lighting, local cementing. To prepare the top for use, melt paraffin and with a soft cloth or brush wipe a little over the surface. Then with a warm iron press in all the surface will absorb and wipe off the excess. When it is cooled, go over it with a coat of spar varnish which will not spot with water. The linoleum top saves the dishes; hot or wet pans may be set on it without injury; and it can be used as a bread and pastry board. A well chosen pattern will make the table a pleasant addition to the room, and the smooth surface needs only an occasional renewing of the varnish.

Making the Home More Attractive

THERE are always a lot of small jobs about the home that may be done with little effort and slight expense that will add greatly to its attractiveness and convenience. It is wonderful what a little paint and varnish will do toward renewing the beauty of a room or an old piece of furniture. Most men and women and boys and girls have plenty of time to do such things if they can get up sufficient courage to tackle a particular job.

Start with some simple job like painting the kitchen or enameling the woodwork in a bedroom. There are always certain precautions to take. For example, the surface should be clean and smooth. Have the paint carefully mixed and use a clean brush. There is a little knack in applying paint to avoid streaks; this can be learned with a little practice. To brush out lines, finish the stroke toward the surface already painted.

A job that may be easily done is to enamel chairs and tables that are bought unfinished. Unfinished pieces cost only about one-third as much as the finished articles. The person who can do this sort of thing will not only be well repaid in the satisfaction obtained, but will make a good wage when the money saved is considered. When tackling a job of this kind, buy only good paint materials and carefully follow the instructions given. A job of this sort is one that the whole family will enjoy, so be careful that too many helpers do not spoil the job. When doing a job of varnishing or enameling, always do the work in a warm room and in one that is free from dust.

In many homes there are old pieces of furniture, made of the finest materials, which are covered with paint and relegated to an obscure part of the house. Such pieces if refinished in their natural colors would be almost priceless. The first big job in renewing old pieces that have been painted or varnished is to remove all the old paint material. Much of it may be removed by means of a varnish or paint remover. The job can then be completed by using scrapers, mineral wool, and sandpaper.

After the surface is thoroughly cleaned and freed from dust, if in good condition apply a coat of filler and a coat of the best quality varnish available. Follow in 24 hours with a second coat of varnish, brushing the varnish out smoothly. After 24 or 48 hours, polish the surface down with rotten stone and water. An old piece of felt hat makes a good polishing cloth. Wet it and dip into the polishing material and rub until the surface is perfectly smooth. After perfectly dry, apply the final coat, and after a period of a week, polish again with rotten stone and linseed oil or water. The results will be gratifying and worth all the effort taken.

Finishing Table Tops with Linoleum

Often remnants of inlaid linoleum suitable for covering tops of work tables may be secured at very reasonable prices. For best results cement the linoleum to the top with waterproof glue or standard linoleum cement, and trim the edge of the linoleum flush with the table after

Checking Up on the Shop

TAKE a look in your shop some spare hour and see if the tools are in place. Try the saw and see if it will cut, note the condition of the auger bits, also see if the keen edged tools are sharp. While many farmers do not have adequate tools to do the jobs that need to be done about the place, there are many other farmers who do have tools, but they are often misplaced and are not to be found when needed, and when they are finally located often they are in poor condition. In fact, tools that are not in place are usually those that are neglected.

In checking up the shop equipment, ask yourself the following questions: (1) Is my shop equipment adequate for the work I need to do? (2) What condition are the tools in? Can I work efficiently with them? (3) What do I have in my shop that is useless and is taking up valuable space? (4) Are my tools placed conveniently? Wouldn't it be well to have a tool rack?

More Tools Needed with Power Machinery

With the advent of power machinery on the farm, a greater variety of tools is needed than formerly. Special sets of wrenches are often needed, also chisels, pliers, a hack saw, thread cutting tools and special drills. The farm hand who formerly drove a team took a supply of baling wire and binder twine to the field with him to hold his implement and the harness together. Now when driving a tractor, a more complete set of equipment must be available.

As to the condition of the tools, dispose of all tools that are in poor condition. Worn out tools are expensive in the end. They waste time and often result in a poor job. A high class tool is the first step toward a first class job of repair or construction work.

Useless and worn out tools and junk should be discarded from the shop. Old implements sometimes contain parts that might be salvaged for repairs; they should be stored in an accessible place but not so as to clutter up the work shop. Remove all old boxes, rusty iron, and general scrap material that has accumulated.

Finally, every shop should have a well constructed rack for the tools. A good tool rack saves space and it also saves time. "A place for every tool and every tool in its place" is a good motto. This is a motto that is hard for many mechanics as well as farmers to live up to. I have seen tool racks made like a bulletin board with an outline of each tool painted on it. This sort of rack makes it easy for anyone to replace the tools where they are supposed to go. With every tool in a particular place, you know where you can find it when you need it. This saves time and improves the efficiency of the worker. In addition to the tool rack, another rack for lumber and other material is desirable. The size and shape of this rack depend entirely on the amount and size of stock kept on hand. A rack makes possible the sorting of the good ma-

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material from the junk and scraps. It leads toward economy and better use of material on hand.

Some Problems of Rural Electrification

THE LACK of a uniform rural rate schedule is considered by many as being the outstanding problem in rural electrification. At present, one company may have an endless number of rates. This is a situation that is difficult to explain to the satisfaction of the average rural consumer. One type of rural rate is needed for all rural customers. This rate should be equitable to all concerned, and it should be easily understood. Some of the best informed men studying the rural electrification problem believe the solution is a rate built on a service charge plus a low energy charge.

Another problem is to build up a sufficient load so that a low rate will apply and at the same time keep the power demand as low as possible. The use of small motors operating small grinders, etc., for a long period instead of large motors operating large grinders, etc., for a short period is necessary.

In applying electricity to the farm, we recognize four types of problems: economic, agricultural, engineering, and educational. These are purely economic problems, which are no doubt the most important as far as the final application of electricity to the farm is concerned. Electric service must be supplied to the farmer on a basis so that it will serve his needs economically. However, we must also measure the value of electricity by its effect on the home life of the farmer as well as by its monetary returns.

There are agricultural problems, for in the adaptation of a new type of power there must necessarily be some slight changes in methods and practices. Some of the new applications of electric power to farm operations are: electric sterilization in dairies; stationary spraying; use in poultry production—water heating, brooding, etc.; use in seed germination and crop drying.

There are engineering problems in

the application of electricity to the farm. New machines will be designed and new adaptations made. Proper standards of transmission line construction that is necessary for farm electric service must be provided. All electric transmission lines should be built to reduce hazards to a minimum; these should be of such capacity as to insure good service without needless expense.

Finally, there are problems in education. Many farmers who now have electric power available from power lines can only appreciate it as a source of light. They need to be educated in regard to the practical economic uses to which electricity can be applied in the many operations about the farm.

Electric Motor on the Farm

THE ELECTRIC MOTOR has found great favor about the farmstead on those farms which have electric power service, according to F. C. Kingsley of the Illinois Experiment Station, who is devoting his entire time to the problem of rural electrical development. He states: "This is due in part to less time and trouble required to start any machine, and also to other features, such as its automatic control, remote control, size, ease of application, uniform speed, efficiency and long life. The electric motor can be applied very easily to any stationary machine on the farm, and due to its convenience, saves much time about the farm in doing the chores. It does not need a great deal of attention and is always ready to go in hot or cold weather. With proper attention given to oiling, fusing and cleaning, the electric motor will last about twice as long as the ordinary gas engine."

The electric energy required to operate small electric motors is very slight, and the cost of operating is almost negligible when compared to the labor required to do the same work by hand. No farmer who has electric power available can afford to be without electric motor-operated units wherever small gas engines are now used, such as the water system, electric milker, small feed grinder, washing machine, cream separator, vacuum cleaner, etc.

Compatible and Incompatible Graft Unions

(Continued from page 8)

ing topworked Kelsey to Robe very successfully. I have watched with interest several orchards of President (Domestica) grafted on Formosa (Japanese) in Placer county. At first, the unions seemed to be good, but after bearing four or five crops, the tops began to break off, thus justifying the old belief that such a union is incompatible. Another case, that of Imperial prune on Formosa, in Yuba county (James Henderson's orchard near Marysville) behaved in the same manner.

Japanese varieties, on the other hand, seemed to make a satisfactory union when grafted on Domestica sorts.

All Japanese varieties and most of the Europeans do well on both peach and almond. Diamond, a Domestica variety, makes a precarious union with peach, especially when nursery budded. When grafted on established trees, it greatly overgrows the stock, but not many break off. It makes a perfect union with almond. The Robe de Sergeant does not generally thrive on either the peach or the almond.

Sugar prune on peach always makes a bad union, according to Millard Sharpe, of Vacaville.

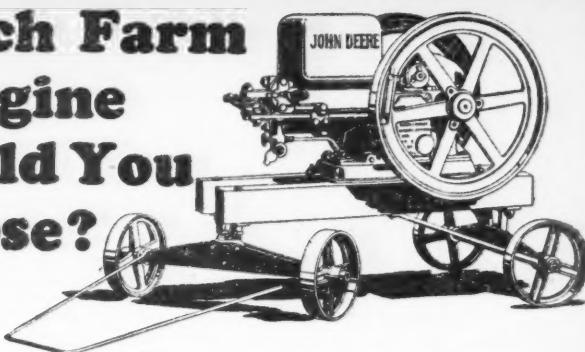
I have seen a single case of Japanese plums topworked on branches of an old sweet cherry tree. When I saw the grafts, they were three years old and were making a rather weak growth but were bearing a nice crop of fruit. I do not believe they survived very long.

Walnut.—The cultivated walnut can be successfully budded or grafted on

seedling English walnuts or any of the various species of black walnuts. The union seems to be good in all cases, but experience teaches that only one stock should be used in California, and that is the northern California black walnut, which is native to the Sacramento and Napa valleys. Walnut men have had some experience in growing trees on the southern California black walnut and have found that stock to be unsatisfactory, possibly because the southern black does not normally make as large a tree as the English walnut. The northern California black, in good soil, will normally make even larger trees than the English varieties, but in practice the rate of growth of the two seems to be very much alike, so that the union is smooth and quite secure. The eastern black walnut normally makes a much larger tree than the English. In France, I have seen two or three species of Moroccan walnuts used as stocks, but the trees behaved much like ours do when grown on southern California black—that is, the stock tree was too small or slow-growing for the variety.

SECRETARY of Agriculture W. M. Jardine stated in Salt Lake City, Utah, on February 4, that he would call an interstate conference of apple growers of the section as soon as Congress adjourned in order that the threatened embargo by the British government on American apples and pears may be discussed. The conference is expected to clarify and make uniform the regulations issued some time ago by the Bureau of Chemistry regarding apple shipments.

Which Farm Engine Would You Choose?



If you were given your choice between two farm engines—one with its cylinder, gears, bearings and other important parts exposed to sand, dust and dirt, one having a number of grease cups and oilers to fill, adjust and watch;

—another engine with all of its important parts (cylinder, bearings, gears) all completely enclosed in a dust-proof case, with a simple automatic oiling system that does away with all grease cups and oilers—an engine that will run until the fuel is exhausted without one moment's attention—

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The Orchard Home Department

By Mary Lee Adams

The Garden Is Waking

WHEN March winds blow, they may bring snow in certain sections. Where this is the case, the orchard woman turns from any consideration of flower gardens with the thought that there's plenty of time ahead before spring.

But the AMERICAN FRUIT GROWER MAGAZINE goes to homes all over the United States, and for many of our southern readers March is a real spring month. April treads so closely upon the heels of March that, wherever you happen to live, it is not too early to give some thought to the garden, upon which will depend so much of the pleasure you should have in the coming summer.

If your garden plot is not yet laid out, now is the time to decide upon its extent and location. I would suggest that you make it about half the size you now feel you can conveniently handle.

Almost all beginners in gardening are disposed, in the words of a very homely adage, to "bite off more than they can chew." The result is sure to be disappointing. The gardener gets so tired trying to keep a large area in order that she grows disheartened and feels disposed to give up the attempt.

A foundation planting of shrubs and flowers about a new house will do more to improve the appearance of the home than any other one thing. From this, by degrees, the flower lover may progress to borders and, in time, a regular artistically designed garden may become the source of constant delight and pride.

Young or Old, Be Happy

EVEN people who have faced every trial of life with admirable courage sometimes quail at the thought of growing old. True, it has its obvious drawbacks but, as a famous French writer points out, it is the only known method of living a long time. Like spoiled children, we want to live long without growing old.

Look about you and take note of the happiest old people you know. They are those who have kept a fresh sympathy with young and old alike, who have not lost a kindly interest in life. To these comes "that unhoisted serenity that men call age."

Serenity is a marked and most lovely characteristic of many old people. The young are often restless with eagerness but in the company of serene old people we feel a blessed sense of repose.

Old age comes especially gently to those living in rural homes. Their family ties are still strong. Three generations may dwell under one roof or within close call of each other.

And about a farm or orchard home there are always a host of little things to do. What a blessing for old hands that hate to be idle! Younger members of a family sometimes make the tender error of wishing to do everything for the old people. "Now, Mother, you just sit still and I'll get it for you," or, "Let me do that. I'll have time for it, if I hurry." How unkind is such kindness. Better to hunt up occupation for those dear ones whose physical strength is waning.

None but the young can hope to swim the Channel, fly to the pole or even win a race. But mental activity endures if exercised. Those who supinely take it for granted that because they have reached a certain number of years they are past usefulness or enjoyment, age much faster than the dauntless who ask themselves, "If I can no longer do this or that, with what shall I occupy myself in place of it?"

I read recently an inspiring article by Gardner Teall, on a delightful old English lady, Mrs. Mary Delaney. At the advanced age of 73 she began to make exquisite reproductions from

nature of plants and flowers, cutting each tiniest part from many-colored papers and mounting them in graceful sprays on squares of black paper.

So beautiful and scientifically accurate was her work that, though first undertaken as a mere pastime, it now forms one of the treasures of the famous British Museum in London. No woman of our time can show more enterprise than did this charming old lady born in 1700.

When her eyesight failed a few years before her death at the age of 88, Mrs. Delaney had completed 1000 perfect studies. Though she naturally grieved over the loss of her sight, she did not idly repine, but turned from her beloved art to the spinning wheel for occupation.

Can we wonder that so fine a spirit retained to the end of her long life the active friendship of noted personages? Thus she was spared what may be the real pathos of old age—that is loneliness.

Teeth Made to Chew With

FROM England, where teeth are so noticeably bad, comes the warning of a physician who claims that the practice of eating only soft foods is responsible for the deterioration of the British jaw.

Our own dentists advise us that we, as a nation, also have a tendency to over-indulge in soft foods. We need something to chew on. Children fed on mushy foods alone cannot develop proper mouth muscles. Moreover, the digestive fluids do not flow freely from the unexercised salivary glands. This results in poor digestion as well as in dental trouble.

The ounce of prevention is well worth while. Even if your own faulty habits of eating have made it too late for you to secure sound teeth, give your children the best possible chance to escape the pain, expense and disfigurement of bad teeth.

The three most important habits to instill in this respect are regular morning and evening brushing, periodical inspection of their mouths by a reliable dentist, and a certain amount of crusty, chewable food daily.

The School Library

EVERY SCHOOL should certainly have a library for the use of the scholars. Most of them do, and what's more, the scholars make good use of them.

For this assertion, we have the word of no less a personage than the Librarian of the British Museum, which shelters a huge and wonderful collection of books. While touring our country recently, this authority remarked upon the unrivalled excellence of American libraries and upon our intelligent use of them.

To our pleased surprise, he highly commended the use that pupils here make of their very excellent school libraries. In this respect, he found our scholars more studious than those of other countries.

Has the school your children attend a library? It is sometimes rather difficult to establish a really worth while library in connection with a rural school, but it is well worth the pains necessary.

Haphazard methods will not do. Occasionally even school teachers will dampen enthusiasm by saying that the scholars don't read even such books as they have. Why not? Other scholars do. What are these books they have?

Sometimes the school library is regarded as a convenient dumping ground for books of no especial worth. They clutter the home bookshelves and present a problem for disposal, even a thin book being hard to burn. Why should school children read such books?

Making Ends Meet

IF THE incoming end fails to meet the outgoing end of the bank balance, a very strained situation is brought about and it usually results in cutting off from the outgoing end everything but sheer necessities.

It's been jokingly said that necessities are the less important part of life, but there's no denying that non-essentials are immensely important also. Often, they seem more so to the woman than to the man of the family. He is doing his bit by making a living. She would like to make living more attractive.

It is to such women that the idea comes of earning something themselves. They cannot as a rule enter upon a regular business career. Either they have not the requisite training, or the demands of home and children forbid their going out to work.

Yet they do yearn for the things that, without being absolutely necessary, would add a great deal to the comfort, pleasure and appearance of the home and family. They hear of other women earning "pin money," so why not do that? But when they get right down to it, the matter is puzzling.

Some Big Successes

One of the best known and most encouraging examples of pin money enterprise grew out of the celebrated Pin Money Pickles of Richmond, Va. Starting over the kitchen stove, just as any orchard woman might start, the business grew to imposing and very remunerative factory size.

A similar tale was told me by an employee in a beauty parlor of the Far West, concerning a famous brand of face creams with which she had long been associated. This product, which now so thickly dots the continent from ocean to ocean, began with the cook stove experiment of a widow in Chicago. There must be millions in it today.

Anti-Kink, a preparation for straightening the frizzy hair of the descendants of Ham, originated in much the same way. It made a large fortune for the clever colored woman, who developed an enormous clientele among the ambitious members of her race.

Take Note of This

Doubtless this list could be greatly multiplied, but the successes that it tells of, while far beyond what most pin money earners can reasonably expect, point to two important and stimulating considerations.

First, in each case we have mentioned, the individuals to whom was due the credit of originating and starting the business, reaped the reward. That is very encouraging and very different from the unkind fate which has befallen so many inventors whose patents have, indeed, brought wealth, but not to the inventors.

The second thing to note is that in every instance mentioned, the product was good, excelling or ranking with the very best of its kind. Pin Money Pickles can't be beat. Anti-Kink does what it claims to do. The cold creams alluded to are of an excellence that induces millions of women to use them and, what is more to our present point, to buy them.

Do It Well

No one who sets out to make pin money can afford to overlook that whatever is offered for sale must have merit. Put a few careless stitches on a trifle for a Christmas gift for a friend and you can count on enthusiastic appreciation. That's friendly. But not so when an article is to be sold. That's business. If fairness to customers did not demand good work, the keen competi-

tion of business, even in small communities, requires your very best efforts if you would win success.

Gasping over the price tag attached to some simple but dainty bit of underwear or child's dress in a specialty shop, we think, "Why I could make that in a few hours!" But when we express to the saleslady our surprise at the price, she replies, serenely, "You see, Madam, this is fine hand work." There may not be much of it, but it is perfect in taste and execution.

It all comes back to Emerson's assertion that if a man living in the depths of a forest makes the best mouse traps in the world, the world will make a track to his door. I rather fear that today he might have to bring his traps to the edge of a motor road, but the idea is sound, particularly for those who, in the very nature of things, cannot go in for what is called "quantity production." The home money-maker should adopt for her output the motto "Small but choice."

What to Do

Originality is a rare gift, but nearly everyone can do a few things well. What can you do that there is a demand for? Finding a market requires some initiative, but thought and effort, the example of others and the good will of friends and acquaintances will help a great deal. Often opportunities lying close at hand are overlooked.

There is not much to be gained by making haphazard suggestions. You may have much better ideas than I can offer. For instance, the hunger appeal is admittedly the strongest and most universal, but if you live far from a thoroughfare, it wouldn't help you much to be told what a thriving business is done at roadside stands with tempting displays of fruits, sandwiches, coffee and cold drinks, honey, preserves, etc.

If you must cook, perhaps your best prospect is to make connection with some established place of refreshment, such as a tea room, or drug store lunch counter, to which you undertake to furnish certain things, or where you may be permitted to place your wares on display. Once your product gets a reputation, there will be many eager bidders for it.

Other Openings

If you have originality in creating novelties or favors that will cause a laugh or be admired for their beauty, you have a good money-making gift. Hand-work, for which high prices are paid, may be placed in specialty stores. Or you might create a demand for your work among a circle of acquaintances by underselling the stores and yet getting a better price for yourself than most stores would give.

In more homely ways, there's the chance to help out with the neighbor's children. In cities, a rate of so much per hour is paid for this service. Women come in to look after the children while mothers shop or simply frivol. A well-bred, responsible woman is in such demand that engagements must be made days ahead. In the country, the little tots may be dropped at the caretaker's home on the way out and called for as the mother returns. Keep the children so content that they will want to come again.

Keep Eyes and Ears Open

You yourself can best estimate the demand in your neighborhood. Friends and acquaintances often express a wish for this or that. The frequency of such expressions indicates a possible market. If you possess what is called "sales ability," you may even create the demand. A long felt want is not always recognized until it is supplied. Then all at once, as in the case of radio, dozens of people feel that they can hardly live without it.

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Apple Varieties and Fruit Setting Factors

(Continued from page 7)

Response to Low Vigor

The two groups of varieties also have a different response to low vigor. On weak spurs of all varieties, the central flower has a decided advantage over the laterals. As such flower bearing spurs become lower in vigor, the competition for water and nutrients between the developing flowers becomes correspondingly greater. More flowers fail to obtain an adequate supply for normal development.

On trees of low vigor, the varieties of the first group will set a higher average number of fruits per spur than varieties of the second group. This is largely due to the fact that the varieties of the second group have a much larger proportion of lateral flowers, which cannot set fruit. With low vigor, even the lateral flowers, which could set fruit if they received an adequate supply of water and nutrients, will fail to develop normally. This is indicated by the particularly low set of lateral flowers of the weak Stayman Winesap trees I-3, H-2 and H-3 (see table) receiving no nitrogen fertilizer. Moreover, in hand cross-pollination studies on weak Stayman Winesap trees, practically all lateral flowers failed to set fruit, leaving fruits in the central position only.

It has become evident that trees of moderate vigor of the varieties in the first group may set sufficient fruits for commercial crops, while trees of the second group of varieties with the same degree of vigor are not sufficiently fruitful. It has been occasionally recommended that excessive fruit setting be prevented by reducing or withholding the nitrogen application to apple trees. However justifiable such attempts are to regulate the number of fruits set with such varieties as Baldwin, Jonathan, Wealthy, Oldenburg and others of the first group, they have absolutely no place in the cultural practices of such varieties as Delicious, Rhode Island Greening, Stayman Winesap and other members of the Winesap family mentioned in this paper.

Response to Exceptional Vigor

As already suggested, the results from the fruit setting studies indicate that another and unknown factor independent of competition for water and nutrients is to a considerable degree responsible for the differences which exist between the fruit setting characteristics of the two groups of varieties. This is indicated in part by the failure of such a large percentage of the central flowers of vigorous clusters of Winesap and Arkansas to set fruit. If any flower receives a sufficient supply of food and water, it should be the central flower of a cluster. Another expression of this is also found in the small percentage sets of the lateral flowers of all four varieties of the Winesap family to set fruit. Vigorous trees of Winesap and Arkansas often fail to set satisfactory commercial crops. However, the studies indicate that the effect of this other factor may be partially eliminated at least by the stimulation of the trees of the varieties in the second group to an exceptionally vigorous condition.

In this connection, it appears that an increase in the fruitfulness of these varieties of the Winesap family depends more upon this marked increase in vigor than the discovery of any particularly favorable pollinating variety. With Delicious and Rhode Island Greening, the importance of exceptional vigor cannot be questioned. In several instances where Rhode Island Greening had been unfruitful, it has been reported by several investigators to have been made sufficiently fruitful for commercial crops by heavy pruning. The unfruitful condition had been laid to inadequate pollination (even though effective pollinizers were present). The variety appears to require more than ordinary pruning and fertilization. Mature trees of Delicious should also be kept exceptionally vigorous for the most fruitful condition.

In connection with the effect of exceptional vigor upon fruitfulness, Heinicke and others have reported that the Anjou pear has also been made to set sufficient fruits for a commercial crop by heavy pruning when inadequate pollination had been previously thought to be the limiting factor.

It should be kept in mind that the various branches of a tree may differ considerably in vigor. The upper branches on a tree which receives five pounds of sodium nitrate or ammonium sulphate may be very vigorous while the lower ones are rather weak. The importance of exceptional vigor in all parts of the tree of the varieties in the second group, if they are to be satisfactorily fruitful, must be kept clearly in mind.

Exceptional Vigor Not Harmful

Exceptional vigor has been considered by some to result in the falling of the flowers or a decrease in fruitfulness of apple trees. In the first place, statements have been made that trees during their first few years of blooming tend to drop their flowers without setting fruit. It is becoming evident, however, that varieties differ on this point. Trees of certain varieties, such as Baldwin, Wealthy, Oldenburg, Yellow Transparent and others, whenever flowers are formed, regardless of the age of the tree, will usually set several fruits to a cluster. Young trees of several other varieties, such as Delicious, Nero and Stayman Winesap, just coming into bearing, may drop practically all their flowers without setting fruit. That this difference between varieties is due to differences in the vegetative condition of the trees of the varieties mentioned, seems somewhat questionable.

However, as far as mature trees of the apple are concerned, there is no evidence that exceptional vigor results in the falling of flowers. Practices such as heavy pruning and heavy fertilization have not appeared to decrease the percentage of flowers setting fruit. On the other hand, the results indicate that the greatest fruitfulness of certain varieties mentioned herein is obtained when the trees are stimulated to exceptional vigor.

Different Response to Weather Conditions

Since it appears that even with exceptional vigor a considerable proportion of the flowers of the varieties in the second group do not appear to be able to set fruit, adequate cross-pollination of the flowers which can set fruit is necessary. Unfavorable weather during the blooming period would tend to decrease the yields of the varieties in this second group to a greater extent than those of such varieties as Baldwin, Jonathan, Grimes Golden and others of the first group. For example, unfavorable weather conditions during the blooming period of the central flowers of Arkansas Black and Stayman Winesap would likely result in an unsatisfactory yield of these varieties even though the weather conditions were favorable during the blooming period of the lateral flowers.

Different Response to Frost

In view of the differences in the average number of fruits set per cluster in the various varieties, it is obvious that frosts, unless sufficiently severe to kill all flowers or fruits, are a more serious limiting factor to satisfactory commercial crops in varieties of the second group than in those of the first. This probably explains why Delicious, Stayman Winesap and other varieties of the Winesap family are known among orchardists to yield less satisfactory crops following a moderate frost than varieties of the first group.

Practices Stimulating Exceptional Vigor

Heavy dormant pruning and heavy fertilization are the most commonly used practices to stimulate bearing

(Concluded on page 42)



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CHATS WITH FRUIT GROWER'S WIFE

By HAZEL BURSELL



Rejuvenating the Living Room

"OH, HOW I wish this house could suddenly be transformed! It's so old and dark and dingy," you muse as you gaze longingly at a group of charming interiors in your favorite magazine. "But I guess it'll just have to stay the way it is," you murmur resignedly. "It would cost too much money, and then I wouldn't know how to go about such an undertaking, anyway."

My dear, you can have your wish, if you really want it sufficiently to study and plan carefully, then to work tirelessly till the task is accomplished—and you can do it without a great expenditure of money. Are you game to try?

Study Type of House

The first thing you will do is to take an inventory of all your assets (some of them may look like liabilities, but list them anyway). Note the type and general style of the house itself. Is it low and rambling and informal looking? If it is, then you will want the interior to be informal, homely and friendly in appearance. Is the house large and square and dignified? Then the rooms within the house should have an air of dignity, restfulness and quiet, but not dullness. Is your house of the ever-popular Colonial type? Then are you fortunate indeed, for yours will be the joy of planning and achieving a true Colonial interior. It makes little difference whether your house is English, Spanish, Colonial, or just plain house, so long as you understand that each house has a distinctive personality and that the interior must harmonize with this personality. The interior takes its cue as to type from the exterior.

Take an Inventory

The next step is to complete the inventory as to furniture, curtains, pictures, silver, china, linen, number, height and sizes of rooms, types of windows and amount of wall space in each room, and any other facts that might be useful in planning your interiors. If you have any really good old-fashioned pieces of furniture stored in the attic, such as walnut dressers or chests of drawers, or interesting chairs or small tables, be sure to list them too. When repaired and polished, they fit in most effectively with more modern pieces in halls, living rooms and bedrooms.

Ye Editor hopes you are not in her predicament. She has a perfectly handsome heirloom spinning wheel, and tragedy of tragedies, nary a place in her whole house to put it! But some day she'll build a real Colonial house with a special place by the fireplace or on a stair landing for her spinning wheel.

If you possess such a spinning wheel, be sure to find a place for it in your scheme of decoration. Then plan other arrangements and furnishings in keeping with it. It will lend a touch to your living room or hall that you could achieve in no other way.

Study Magazine Pictures

Now, knowing what pieces of furniture you have on hand, and knowing the general type of interior best suited to your home and this furniture, you will begin to study. Look through all your late magazines and any other good ones you can buy. Cut out all pictures containing ideas that might be incorporated in your plan of decoration. Read any articles you may find that discuss your particular style of house and its furnishings.

You, and you only, can plan all the details of your furnishings. We can only offer certain suggestions and general rules by which you may be governed. The first need is for simplicity. Eliminate all ugly and useless pieces of furniture, pictures, and bric-a-brac, putting into the living room only such things as serve a definite purpose and seem to belong in that particular place in the room. Never use photographs of friends or paintings of ancestors in the living room—they are personal and belong in the bedroom.

Color Harmony Needed

Another "must have" is color harmony, for only through color harmony can you secure that effect of restfulness, dignity, unity and charm which you desire. To do this, have the bulk of the room's contents in neutral colors, such as creams, tans and browns, then introduce two or three brighter but harmonizing colors to add gayety and life to the room. Beware of too many colors. Also beware of too many different types of figures in wall paper, upholstery, carpets and drapes in any one room. The rule is figured drapes with a plain or practically plain wall paper, and either figured rugs and plain upholstery on the furniture or figured upholstery and plain rugs. Figures should not be too bold in any case.

In general, light colors and warm, cheerful colors would go in a rather dark room. By warm colors, we mean yellow, rose, orange, mulberry and red. A room which is bright and sunny could well be furnished in blues, greens or grays with just sufficient color touches to liven it up. Remember, the brighter the color, the less of it you will want to use in any one room, if you would have a restful effect. Bright colors are all "stimulating" rather than restful.

Background Important

The floors, walls and ceilings are the background against which your pictures, drapes and furniture are arranged. This background is important. It must be inconspicuous and yet seem to blend in with the other things in the room. If the floors are of hardwood, they need nothing further than a thorough waxing. If old and of soft wood, they may best be painted a tan color. The safest choice for woodwork is a good ivory or very light tan-colored enamel. The wall paper should be lighter in color than the floor, but not too light. A delicately figured tapestry paper with just a tinge of your chosen color is perhaps the wisest choice for living and dining rooms. The ceiling should be lighter than the wall paper in color.

Most houses which have been lived in for a number of years will seem like new places with just a new coat of paint or enamel on the woodwork, the floors freshly painted, waxed, varnished or linoleum covered, and the walls and ceilings freshly papered or calsoined. With the addition of new, yet inexpensive, curtains and drapes throughout, the owner herself would hardly recognize the place.

There are but few families in this country who cannot afford paints, enamels, wall paper and curtain materials with which to transform their home, especially since members of the family will furnish all the labor in connection with said transformation. The homemaker can plan to purchase as little or as much in addition as her income warrants. Perhaps she can purchase these things now, and

then month by month add a few other things as the money is available.

Fireplace Is Center

At last, you are ready to begin the actual planning. Take paper and pencil and jot down the main pieces of furniture for the living room. Has it a fireplace? Then that will be the center of interest and other furnishings will, in the main, be grouped around it. Lacking a fireplace you will have to plan a center of interest in the form of a group, such as a divan with picture, mirror or tapestry above it, chairs set formally at either end and possibly a low table or bench in front. This "center of interest" would occupy the center of the largest wall space. Every living room must have a center of interest. A good-looking oblong table might take the place of the divan in the group mentioned.

Perhaps both the rug and the upholstered furniture are figured. You can remedy this by making slip covers of tan or gray or brown denim to fit the upholstered pieces. These slip covers will cost very little and will change even a most uninteresting or positively ugly chair or divan into a charming and harmonizing piece of furniture. If the rug is plain, but the figures and colors in the upholstery are uninteresting or too gaudy, you can make slip covers of cretonne or glazed chintz in suitable colors with conventional figures. This same cretonne or chintz could be used for drapes at the windows.

Paint Renews Chairs

If you have among your pieces of furniture certain chairs, small tables, or possibly a desk that has grown shabby from long service, these can be refinished. The chair and a small table would make a charming group if enameled some gay color which would tone in with the other furnishings, drapes, and rugs—such as orange, blue, black with orange or bright blue decorations, green or mulberry. If there is a small, spindle-backed rocker, this might also be painted the same color for use in another part of the room. The desk may be refinished, together with a suitable plain chair, so that they will be as good as new, and possibly even more distinctive looking. To do this, remove the old finish with varnish remover, sand the surface, then re-finish with several coats of walnut varnish, sanding lightly between each coat. The last coat may be sanded lightly with fine sandpaper or rubbed with powdered pumice stone and oil, and finally waxed. This latter treatment gives a rich, dull polish.

Various Drapes Described

Drapes can be made in innumerable styles, all of them good, and most of them suitable for the ordinary living room. Valances may be pleated, plain and mounted on a shaped frame, gathered, Shirred or omitted entirely. They may be scalloped or straight at the edge, and either plain hemmed, bound in black, or fringed. Living room drapes should be lined with unbleached muslin or pongee if they are to retain their shape and color longest. Thin glass curtains may be omitted if desired, but in most cases the room assumes a "bare" aspect without them.

Glazed chintz would be most effective with a straight pleated valance and straight hanging side panels over thin tie-back glass curtains. Cretonne looks exceedingly pretty when used in a scalloped, blackbound valance over straight or tie-back side panels, with or without glass curtains. A very new window drape arrangement is the use of gayly painted wooden curtain rods with large wooden rings to match which hold the panels of cretonne. Glass curtains are sometimes used with this arrangement, but valances are always omitted. The wooden-rod-and-ring style takes the least material of any type, perhaps, and the effect is quaint and charming. Pongee and tan net curtains with tan silk fringe make quiet but rich looking curtains. Silk drapes are extremely expensive and are really out of

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The shape of the window or the grouping would affect the choice of drapes. If the window is long and narrow, use a deep valance, and let the side panels fall to the lower edge of the window apron. If the window is wide and low, the valance may be shallower, and the side panels may well fall to within one inch of the floor. The longer the side panels, the wider they must be if they aren't to appear "skimpy." A group of windows together is usually treated as one large window, with valance and side panels, or possibly with rod and rings and side panels alone, if that is the style chosen for the living room.

Rug Gives Unity

Rugs may be room-size or in groups of smaller ones. The small ones are less expensive and may look very nice, but they do not unite the room into one whole, as do the larger rugs. Wilton and Axminster rugs are the best of the fabric group, but are quite expensive. They come in beautiful colors and designs and will wear for many years with reasonable care. If your furniture and house should be suited to the Colonial type, you may use oval rag rugs in suitable colors, or you may make some of the quaint hooked rugs so popular just now. Some farm housewives prefer a room-size linoleum in a plain or delicately figured design and suitable color. Then they use smaller fabric rugs in suitable places on this linoleum.

Large, heavy pictures are out of place except in large rooms with

great, unbroken wall spaces. Pictures should fit the space in which they're hung. Small pictures on related subjects may be hung as a group most effectively. Pictures should be chosen with care, and each should have real meaning to the beholder. They should be hung, as a general rule, on a level with the eye of the average person. Frames for pictures should be simple and in harmony with the colors in the picture itself.

Few Accessories Needed

A few well chosen accessories will complete the living room furnishings. Several books between bookends on a low table beside the reading chair, a few gay colored pillows on the divan, a lamp on the table, one or more pairs of candlesticks, the fireplace fixtures and a few pieces of pottery are all that will be needed.

Furnishings for the other rooms of the house will be discussed next month in these columns.

Brush for Papering

FOR A real labor saver few things can beat the wall-paper brush. It is about 12 inches wide, long bristled, and especially designed for the purpose. With the aid of this brush, you can pat on the paper so that no ugly shiny strips show where the paper was joined—the almost invariable result where any other tool or rag is used for this purpose. Many homes will be repapered this spring, so those housewives should save themselves work by buying this brush.

Additional Apple Recipes

NEVER do we tire of apples. The average housewife keeps them on hand in the fresh, dried or canned form, throughout the entire year. They form the basis of many breakfast, luncheon or dinner dishes. They can be used in innumerable ways in pies, cakes, cookies, puddings, fritters, sauces and salads. Additional recipes using apples should always be welcomed.

Apple Tapioca

6 T. tapioca	$\frac{1}{2}$ t. salt
$\frac{3}{4}$ c. cold water	$\frac{1}{2}$ t. lemon juice
2 c. boiling water	$\frac{3}{4}$ c. sugar
3 tart apples	

Wash, pare, core and cut apples in eighths. Soak tapioca in cold water for 1 hour. Place all ingredients in double boiler and cook 1 hour. When cold serve with sugar and cream.

Scalloped Apples

4 tart apples	2 T. lemon juice
$\frac{3}{4}$ c. sugar	1 c. soft bread
Cinnamon	crumbs
Nutmeg	$\frac{1}{2}$ c. butter
4 T. water	

Melt butter and add the crumbs. Butter a baking dish. Cover bottom of dish with crumbs. Have apples washed, pared and sliced in thin slices. Arrange on the crumbs. Sprinkle the apples with the sugar, spices, lemon juice and water. Cover with the rest of the crumbs, and bake until the apple is tender, which should be about one-half hour. Apple sauce may be used in place of the raw apple, in which case a shorter time for baking will be necessary. Serve with cream and sugar.

Apple and Celery Salad

1 $\frac{1}{2}$ c. celery	2 T. lemon juice
1 $\frac{1}{4}$ c. apple	Mayonnaise

Wash and scrape celery. Cut into $\frac{1}{2}$ -inch lengths. Pare apples and cut into $\frac{1}{2}$ -inch cubes. Add lemon juice to apples and mix lightly with celery. Arrange on lettuce leaf and add spoonful of salad dressing.

Carrot and Apple Salad

$\frac{1}{2}$ c. apple cubes	$\frac{1}{2}$ c. cut celery
$\frac{1}{4}$ c. carrot cubes	Boiled dressing

Mix ingredients lightly together one-half hour before serving. When wanted, arrange on lettuce leaves for individual service. Top with a spoonful of salad dressing and a dash of paprika and serve.

Apples With Prune Juice

6 apples	$\frac{1}{2}$ c. brown sugar
6 t. butter	2 c. prune juice

Core and pare the apples and cut them in halves crosswise. Place them in a baking dish with $\frac{1}{2}$ t. butter in the center of each half. Sprinkle the apples with the brown sugar and pour the prune juice, drained from stewed prunes, over all. Cover the apples and bake at 400 degrees Fahrenheit until tender, basting frequently. Fifteen minutes before removing the apples from the oven take off the cover and finish the baking. Serve hot or cold, with or without cream.

Blushing Apples

1 t. orange juice.	1 T. sugar.
1 red apple.	$\frac{1}{2}$ c. water.

Wash and core the apple. Place in a small kettle, add sugar and water and boil until tender, turning as often as is necessary. When done lift carefully the

skin. Scrape off red portion of pulp from skin and apply to apple. Reduce water in syrup till thick. Remove from fire, add orange juice and pour over apple. Serve cold with whipped cream.

Apple Gelatin Pudding

Soak $1\frac{1}{2}$ T. gelatin in 3 T. cold water. Dissolve in $\frac{1}{4}$ c. boiling water. 2 c. apple pulp (cooked and run through a sieve). 10 dates cut fine. 2 T. honey (more if desired sweeter). 3 T. lemon juice (less if tart apples).

Mix all together, add the dissolved gelatin and mold. When firm serve with whipped cream. This amount serves four.

Apple Crumb Loaf

Oil a baking pan and fill with alternate layers of bread crumbs and thinly sliced apples. A layer of crumbs should be on top and on the bottom. Sprinkle each layer of apples thickly with grated cheese and season with salt and dash of paprika.

Add milk or water to moisten. Bake in a moderate oven until the apples are tender. A tablespoon of oil over the top gives a richer brown color.

Apple Cake

2 c. flour.	4 sour apples.
3 T. butter.	2 t. baking powder.
1 c. milk.	1 t. salt.
1 egg.	

Sift together flour, baking powder and salt. Cut in butter with two knives until evenly distributed. Add milk and beaten egg. Turn out in shallow greased pan. Pare, quarter and cut apples in thin slices, then press sharp edges into dough, arranging in rows. Sprinkle with sugar and cinnamon. Bake about 30 minutes.

Steamed Apple Pudding

2 c. flour	2 T. butter
4 t. baking powder	$\frac{1}{4}$ c. milk
$\frac{1}{2}$ t. salt	4 apples

Mix and sift dry ingredients, work in butter with tips of fingers, add milk gradually, mixing with knife; toss on floured board, pat and roll out. Place apples (pared and cut in eighths) on middle of dough. Sprinkle with 1 T. sugar mixed with $\frac{1}{4}$ t. salt and $\frac{1}{4}$ t. nutmeg. Bring dough around apples and carefully lift into buttered mould or 5-lb. lard pail; or apples may be sprinkled over dough and dough rolled like a jelly roll. Cover closely and steam 1 hour and 20 minutes.

Serve with vanilla or fruit juice sauce. Twice the number of apples may be sprinkled with sugar and cooked until soft in a kettle on top of the range, covered with dough, rolled to size to fit in kettle, then kettle covered tightly, and dough steamed 15 minutes. When turned on dish for serving, the apples will be on the top. Serve with cream or with vanilla sauce.

1 t. equals 1 teaspoonful.
1 T. equals 1 tablespoonful.
1 c. equals 1 cupful.

All measures are level.

How far do Planet Jr. you walk behind a cultivator?

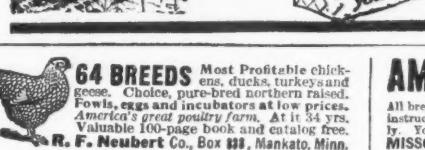
WHEN you hook the single-tree into the clevis of a walking cultivator Or for several miles between rows of corn, or potatoes; tobacco or beans. What sort of a job will it be when it's done? Don't wait until cultivating days are upon you to make up your mind that you'll have a Planet Jr. No. 8 Horse Hoe this year. Planet Jr. No. 8 is the most famous five-tooth walking cultivator made. It is the last word in easy handling; for strength and rigidity; for convenience in adjusting by handy levers to the just right depth and width of cut. It sure lays by clean crops.

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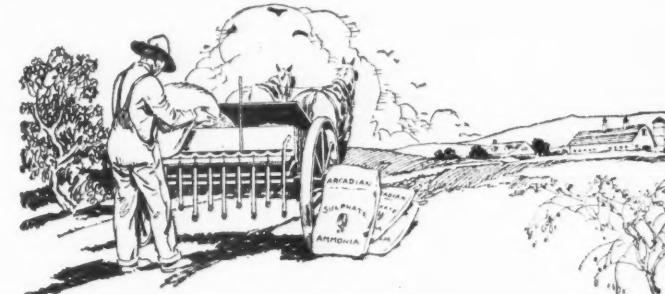
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Professor Fred C. Sears favors consistent orchard fertilization

SAYS Professor Fred C. Sears in "Progressive
Orcharding":

"Usually the man succeeds in proportion as he fertilizes. The man who fertilizes year after year, whether he has a crop of fruit on his trees or not, is the man who usually has a crop."

That's why it's easy to tell, almost at a glance, whether or not an orchard has been consistently fertilized. The condition of the trees tells the story.

A generous supply of quickly available nitrogen in the form of Arcadian Sulphate of Ammonia is needed before blossom time to increase the amount of fruit set, enable the tree to carry a full crop of well-sized fruit to maturity and promote fruit bud formation for next year's crop.

A dime or a quarter spent each year for Arcadian Sulphate of Ammonia on each tree for a period of five years is bound to show a handsome profit. Consistent fertilization pays.

Results prove the availability of the nitrogen in ARCADIAN Sulphate of Ammonia

THE BARRETT COMPANY, AGRICULTURAL DEPARTMENT

Atlanta, Georgia
Montgomery, Ala. Medina, Ohio
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A-1-27

The Barrett Company (address nearest office)

Please send me sample package of Arcadian Sulphate of Ammonia.

I am especially interested in.....

(Write name of crops on line above)

and wish you to send me bulletins on these subjects.

Name

Address

**No. 2848—Slender Lines.**

Cuts in sizes 18 years, 36, 38, 40, 42, 44 and 46 inches bust measure. The 36-inch size requires 3½ yards of 40-inch material.

No. 2908—Suitable for Stout Figures.

Cuts in sizes 36, 38, 40, 42, 44, 46 and 48 inches bust measure. The 36-inch size requires 3 yards of 40-inch material with ½ yard of 27-inch contrasting.

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Cuts in sizes 36, 38, 40, 42, 44 and 46 inches bust measure. The 36-inch size requires 3½ yards of 40-inch material with ½ yard of 27-inch contrasting.

No. 2910—Cont Frock.

Cuts in sizes 36, 38, 40, 42, 44 and 46 inches bust measure. Size 36 requires 3¾ yards of 40-inch material with ¼ yard of 27-inch contrasting.

No. 2967—Sports Dress.

Cuts in sizes 16 and 18 years, 36, 38, 40, 42 and 44 inches bust measure. The 36-inch size requires 3½ yards of 40-inch material.

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Cuts in sizes 4, 6, 8, 10 and 12 years.

ORDER BLANK FOR PATTERNS—Price 10 cents each

For each pattern you order, send 10 cents in coin or one-cent stamps (coin preferred)

FASHION DEPT., AMERICAN FRUIT GROWER MAGAZINE

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Enclosed find.....cents for which send me the following:

Pattern No.Size..... Pattern No.Size.....

Name.....Address.....

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Write advertisement on separate sheet. Please enclose cash with order. For advertisements addressed in care of this publication, allow 5 words for address.

SPECIAL NOTICE

All advertising copy, discontinuance orders or change of copy must reach this office by the 10th of this month for next issue.

Address

AMERICAN FRUIT GROWER MAGAZINE
53 West Jackson Boulevard, CHICAGO

AGENTS—SALESMEN WANTED

NO DULL TIMES SELLING FOOD—PEOPLE must eat. Federal distributors make big money; \$3,000 yearly and up. No capital or experience needed; guaranteed sales; unsold goods may be returned. We furnish you with sample case, license and FREE SAMPLES for customers. Sure repeat orders. Exclusive territory. Ask now! Federal Pure Food Co., W-2307 Archer, Chicago.

AGENTS, \$240 MONTH. DRI-KLEAN-IT MAKES any car look like new. Removes mud, grease, tar, road oil, all in one operation. No soap or water used. Cleans any car for 10¢. Wonderful seller. Exclusive territory. Big opportunity to make \$5,000 a year. Write quick for particulars and free sample. American Accessories Co., Dept. 504, Cincinnati, Ohio.

AGENTS—WRITE QUICK FOR AMAZING offer. Samples and auto furnished. \$17.50 daily plus bonus. Introduce new line hosiery guaranteed 7 months. New sure-fire selling plan gets big business. Start on credit. Samples furnished. Betterknit Textile Co., Dept. 27, Greenfield, Ohio.

AGENTS—NEW PLAN, MAKES IT EASY TO earn \$50.00 to \$100.00 weekly, selling shirts direct to wearer. No capital or experience needed. Represent a real manufacturer. Write now for real samples. Madison Factories, 500 Broadway, New York.

AGENTS—\$72 A WEEK BONUS BESESIDES. Introduce finest line guaranteed hosiery. Beats store prices. 126 styles, colors. Credit given. Samples furnished. Auto to travel in. Write quick. Wilkint Hosiery Co., Dept. 1704, Greenfield, Ohio.

AGENTS—\$60 A WEEK AND NEW AUTOMOBILE. Extra bonus besides. Introduce finest line guaranteed hosiery. Silk hose free for your own use. Samples furnished. Jennings Hosiery Co., Dept. 1704, Dayton, Ohio.

AGENTS WANTED TO ADVERTISE OUR GOODS and distribute free samples to consumers; 90¢ an hour; write for full particulars. American Products Co., 8051 Monmouth, Cincinnati, Ohio.

WE PAY \$48 A WEEK, FURNISH AUTO AND expenses to introduce our Soap and Washing Powder. Buss-Beach Company, Dept. A-150, Chippewa Falls, Wis.

WE PAY \$60 A WEEK AND EXPENSES AND give Ford auto to men to introduce poultry and stock compounds. Imperial Co., D-20, Parsons, Kan.

F FARMS AND ORCHARDS

FOR SALE—FRUIT FARM LOCATED 7 MILES south of Cheboygan, Mich., on M 10 State Trunk line, consisting of 17,000 apple trees, 5000 trees are 20 years old, the balance are from 6 to 10 years and have started to bear. The principal varieties are Wealthies, Snow, Wolf River and Winter Banana, the other varieties are Stark Delicious and Gano. The orchard is beautifully situated on the east side of Mullet Lake, the largest inland lake in the state, with a rise of 70 feet from the lake to the orchard, giving the orchard a complete air drainage. The soil is gravelly sand and will hold its moisture all summer. The farm is equipped with two large tenant houses, three poultry houses, repair and blacksmith shop, hog house, feeding shed 100x36, cooper shop, stone and stucco barn, 100x36, large warehouse and losing shed on private railroad siding on our own farm, also milking equipment with a large hydraulic press operated by steam. The buildings are all lighted by electricity, using the current to pump water, with a 5000 gallon tank for water storage during spraying season, also to operate milking machine and cream separator. The farm is stocked with 100 White leghorn hens, 6 brood sows and 6 pigs, 50 sheep, 5 head of horses, 30 cows, Holstein and Jerseys. We have all the equipment necessary to operate a fruit farm including two large Beau power sprayers, trimming tools, picking bags, picking ladders, tractor with all tools to keep orchard cultivated. For further information write C. L. Randall Co., Cheboygan, Mich.

OPPORTUNITIES IN SOUTHERN CALIFORNIA are better now than ever for the man of moderate means, who desires to establish a home on few acres that will insure him a good living in a delightful country. Lands are reasonable in price and terms attractive. Crops best suited for different localities are well proved. Efficient marketing organizations are at your service. Southern California has a climate you will like—an enjoyable twelve month open season. There are thousands of miles of paved roads. Seaside and mountain areas offer recreation for everybody. Let me mail you our illustrated folder containing dependable information on Southern California. C. L. Seagraves, General Colonization Agent, Santa Fe Ry., 942 Railway Exchange, Chicago.

FRUIT GROWERS IN THE OZARKS OF southern Missouri and northern Arkansas have a big advantage in having soil ideally adapted to fruit and berry growing. A mild healthy climate, mountain spring water, hard surfaced roads, good schools and progressive growing communities make the Ozarks a fine place to live. The nearby cities of St. Louis, Kansas City and Memphis provide great markets. Land can still be bought or rented at prices that insure good profits on grapes, strawberries, apples, small fruits and vegetables. Write Frisco Railway, 880 Frisco Bldg., St. Louis, Missouri.

APPLE ORCHARD, SACRAMENTO, 70 ACRES. Half mile from Gentleman's Row. Wonderful opportunity for one wanting home in the mild climate of the Ozarks. Real live commercial proposition. 60 acre apples, well cared for. Spraying machinery, well tank and buildings. \$15,000. Owner in Chicago. Property clear. Might consider part trade. Lowell Realty Co., Decatur, Ark.

CALIFORNIA POULTRY AND FRUIT RAISING—If you are interested now, or at some time in the future, in owning a profitable poultry farm, or fruit and poultry farm combined, in southern California, send for a copy of our booklet "How to Go in the Chicken Business and How to Stay In." California Hotel Farm Company, 18 North Euclid Ave., Pasadena, California.

FOR SALE—125 ACRE APPLE ORCHARD. Young trees in vigorous condition. Bore first fair crop in 1926. Commercial varieties. 1½ miles from this city. \$5000.00 in cash, balance terms. Theo. Ochs, Cape Girardeau, Mo.

AT A BARGAIN—13-ACRE FRUIT FARM, 1350 fruit trees, also berries and nuts. H. J. Heard, Crosswell, Mich.

NURSERY

MASTODON. THE LARGEST EVERBEARING strawberry, sweet, enormous copper from July to November. 18 full quart box. Alfred, the 1½ inch blackberry. Hardy, sweet, upright grower. Concord grape, 1 year plants, cheap. Strawberry plants, \$3.50 per thousand and up. Catalogue free. Special prices on large lots. South Michigan Nursery, Box 1, New Buffalo, Michigan.

PEACH TREES \$5.00 PER 100 AND UP. Apple tree \$7.50 per 100 and up. In large or small lots direct to planters by freight, parcel post, express. Plums, pears, cherries, grapes, nuts, berries, pecans, vines. Ornamental trees, vines and shrubs. FREE catalog in colors. Tennessee Nursery Co., Box 101, Cleveland, Tenn.

MASTODON WORLD'S LARGEST EVERBEARING. Eighteen one quart. Bears first year, July until winter. Genuine Mastodon plants less than 2¢ each. Why pay more? Champion Originator. Catalogue free. Edw. Lubke, New Buffalo, Michigan.

MASTODON GIANT. NEW, WORLD'S LARGEST fall bearing strawberry. 12 plants \$1.00, 100, \$4. Prepaid. 20 other varieties. Price list free. Honest dealing. Oak Grove Nursery, Kenyon, Minn.

APPLE AND PEACH BUDDED FROM BEARING orchards and sold direct to planters. Save money and disappointment. Catalogue free. Waynesboro Nurseries, Waynesboro, Va.

HIGH-GRADE BABY GROWN FRUIT TREES and plants. Absolute satisfaction guaranteed. Write for price list. Dept. E, New Haven Nurseries, New Haven, Missouri.

APPLE AND PEAR SEEDLINGS, GRAFTING wax, waxed thread, grafting knives and ratia. Whole and piece root grafts. Price list. Whitford Nursery, Farina, Ill.

STRAWBERRY PLANTS, MASTODON EVERBEARING and standard varieties. Prices low. Catalogue. Pirtle Bros. Nursery, Bloomfield, Ia.

CUMBERLAND RASPBERRY PLANTS (TWICE inspected), \$1.50 per hundred; \$12.00 per thousand. S. H. Graybill, Richfield, Pa.

STRAWBERRY, \$3 TO \$3.50—1,000; RASPBERRY, blackberry, grapevines. Wholesale prices. Cloverleaf Nursery, Three Oaks, Mich.

LATHAM RASPBERRY PLANTS, MOSAIC free; strawberry plants. A. B. Coleman & Son, Aitkin, Minn.

CUMBERLAND BLACK RASPBERRY PLANTS for sale. J. A. Combs, Rural Route 2, Covington, Ill.

PEACH TREES FOR SALE, 15,000 MY OWN growing, \$8.00 per 100 and up. J. A. Broom, Alma, Ill.

STRAWBERRY PLANTS, CATALOG FREE. Jet Baker & Sons, Eau Claire, Wis.

GOBLES NURSERIES, GOBLES, MICHIGAN. Very low prices, direct to farmers.

STRAWBERRY PLANTS, FRESHLY DUG, Worthy Lands and Son, Angola, Ind.

PLANTS AND SEEDS

FROSTPROOF CABBAGE PLANTS—OPEN FIELD grown, will mature heads three weeks earlier than home grown plants. Early Jersey Wakefield, Charleston Wakefield, Copenhagen Market, Succession, Flat Dutch. Postpaid: 100, 40c; 500, \$1.25; 1000, \$2.25. Express collect: 1000, \$1.25; 5000, \$5.00. Bermuda onions same prices. Large plants, prompt shipment. Satisfaction guaranteed. Write for catalogue. Piedmont Plant Co., Albany, Ga.

STRAWBERRY PLANTS—EXCELSIOR, IMPROVED Klondike, Missionary, Dunlap, 500, \$2.00; 1000, \$3.25; 5000, \$15.00; 10,000, \$27.50, express collect. We have best list of leading varieties.

ONION PLANTS, WHITE BERMUDA, RED BERMUDA, Yellow Bermuda, 500, \$1.00; 1000, \$1.75; 5000, \$5.00; 10,000, \$16.00. Frost proof cabbage plants, leading varieties, 500, \$1.25; 1000, \$2.00; 5000, \$9.00; 10,000, \$17.00. All onion and cabbage plants post paid. All plants packed in damp moss assuring safe delivery. Asparagus roots, rhubarb and horseradish, sweet potato plants and seed stock. Price list in colors free. Send today for copy. J. A. Bauer, Judsonia, Ark.

POSITION WANTED

YOUNG MAN WISHES ORCHARD WORK, 6 years' experience, practical experience in all branches of commercial orcharding; honest, steady. Open April 15. Address Box 31, care of American Fruit Grower Magazine.

HELP WANTED—FEMALE

WANTED—GIRLS—WOMEN, 16 UP. LEARN gown making at home. Earn \$35.00 week. Learn while earning. Sample lessons free. Write immediately. Franklin Institute, Dept. H, 545 Rochester, N. Y.

LADIES—MAKE \$25 TO \$50 WEEKLY AD- dressing cards at home; experience unnecessary. 20 cent brings full particulars. H. Lighty, Newcastle, Indiana.

HELP WANTED

U. S. GOVERNMENT JOBS, \$95 TO \$225 month. Men, women, 18 up. Steady work. Short hours, vacation. Many spring examinations. Commercial education sufficient. Experience unnecessary. Sample coaching and full particulars-free. Write today sure. Franklin Institute, Dept. H-81, Rochester, N. Y.

FARM WANTED

WANTED—TO HEAR FROM OWNER OF LAND for sale for spring delivery. O. Hawley, Baldwin, Wis.

WANTED—HEAR FROM OWNER, GOOD FARM for sale. Cash price, particulars. D. F. Bush, Minneapolis, Minn.

MISCELLANEOUS

OLD MONEY WANTED—WILL PAY \$100.00 for 1894 dime, S. Mint, \$50.00 for 1913 Liberty Head Nickel (not Buffalo). Big premiums paid for all rare coins. Send 4¢ for Large Coin Folder. May mean much profit to you. Numismatic Co., Dept. 546, Fort Worth, Tex.

EARN \$25 WEEKLY, SPARE TIME, WRITING for newspapers, magazines. Experience unnecessary. Details free. Press Syndicate, 979, St. Louis, Mo.

SONG POEM WRITERS—WRITE RAY HIBELER, D-96, 2104 N. Keystone Ave., Chicago, Ill.

TYPEWRITERS, \$10 UP. EASY PAYMENTS. Yotz Typewriter Co., Shawnee, Kansas.

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BEES

ITALIAN OR GOLDEN—2-LB. PKG. WITH queen, \$4.75; 3-frame nucleus with queen, \$5.50, send for price list. Perkins Modern Apiaries, Dearborn, O.

BULBS

GLADIOLUS BULBS—THIRTY ALL DIFFERENT \$1. Illustrated 32-page Gladiolus Book free. Howard Gillet, Box 328, New Lebanon, N. Y.

CATTLE

FOR GUERNSEY OR HOLSTEIN CALVES, practically pure, write Edgewood Dairy Farms, Whitewater, Wis.

CHICKS

GENESEE VALLEY CHICKS. SINGLE COMB White Leghorns. It pays to invest in quality for breeding stock selected for years for high egg production plus size of bird and egg. Like processes like. We guarantee safe delivery. Write for descriptive circular on how to keep your stock vigorous. Genesee Valley Poultry Farm, Castle, New York.

BUY ATHENEON PURE BRED CHICKS AND get the benefit of our seven years breeding and hatching experience at no extra cost. Thousands of satisfied customers. Write for our color catalog. Free. Athens Chick Hatchery, Box 17, Athens, Ohio.

CHICKS: ATTRACTIVE TERMS, LEADING breeds. Reduced prices. Rich Hill Hatchery, Dept. 602, Rich Hill, Mo.

TOBACCO

HOMESPUN TOBACCO—SMOKING OR CHEWING, 4 lbs., \$1.00; 12, \$2.25. Send no money. Pay postmaster on arrival. Pipe free for ten names of tobacco users. United Farmers of Ky., Paducah, Ky.

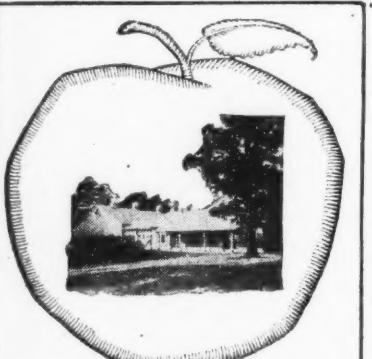
LOOK! FIVE POUNDS GOOD MELLOW SMOOTHING tobacco, \$1.00. Five pounds chewing, \$1.25. Quality and satisfaction guaranteed. Farmers' Club, 55, Hazel, Kentucky.

UN-CURED SMOKING TOBACCO, MILD, FRAGRANT aroma, three years old. Ten pounds, \$2.00. Sample free. Louis Igleheart, Owensboro, Kentucky.

Subscribe to the American Fruit Grower Magazine

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BOYS AIR RIFLE
This fine rifle given for selling only 12 bottles of Liquid Perfume at 15 cents per bottle. Write today.
Eagle Watch Co., Dept. 1280 East Boston, Mass.

LUCK \$ Money. Happiness. Success. Satisfaction. Satisfaction in this rich, new "LUCK" RING. Attracts complete mystique! Be RICH! Win at games, business, love. Order today. Send NO Money \$2.00 on arrival. Postage paid. Guaranteed. Bradley, S-10, Newton, MASS.



Refined Apple Juice and Prosperity for Orchardists!

Mount Gilead Refined Apple Juice is a new source of income and profit. Experience has proved to them the wide, steady demand for a pure fruit juice drink that retains all its natural flavor and delicious taste. And they have found in Mount Gilead Refined Apple Juice the product that exactly answers the public's demands.

By converting their sound undergraduate apples into juice, orchardists can increase their crop by 25 per cent to 33 1/3 per cent. Profit increase in proportion. Worry over low prices and poor crops is ended.

Every orchardist should know what the Mount Gilead Process will do for him in the problem of securing full return from every sound apple he grows. Use the coupon below to secure full details.

FREE

Orchardists are offered a free subscription to the Mount Gilead Orchard Products News, a quarterly publication containing valuable information on marketing orchard products. A free booklet explaining the Mount Gilead Process of Refining Apple Juice will also be sent you.

The Hydraulic Press Mfg. Co.
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Mount Gilead
Process of Refining
Apple Juice

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The Hydraulic Press Mfg. Co.
Mount Gilead, Ohio
Please send me a free booklet describing the Mount Gilead Process of Refining Apple Juice. Also enter my name for free subscription to the Mount Gilead Orchard Products News.

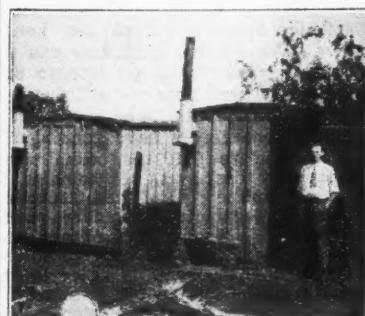
Signed _____

Housing Extra Labor

By C. L. Burkholder

Purdue University

THE PICKING season on the average commercial fruit farm always brings with it many vexing problems, among which is the question of housing the extra labor. Where a considerable acreage of the same fruit is grown in one locality, pickers must be brought in from a distance and provided with satisfactory sleeping quarters. Tents do fairly well in the summer months, but toward fall something of a more permanent nature is



Two houses of a group used for housing labor. Each house will accommodate two persons.

more desirable and almost a necessity. One room cottages built of rough lumber and covered with roofing paper have been found very satisfactory to the pickers and are cheaply constructed. The cottage is made just large enough to accommodate two single cots, a small dresser and a heating stove. In one corner, space is provided to hang clothes, and this is best enclosed with a canvas curtain to keep out the dust. Each cottage should have a good padlock. A little extra expense in providing for the personal comfort of the pickers is sure to mean getting and holding a better class of pickers, many of whom will come back every year. The difference between a good and poor picker will mean a good many dollars to the grower during a season. Labor which has had one or more years of experience also means less supervision and bigger profits.

Farmers Must Be on an Equal Basis

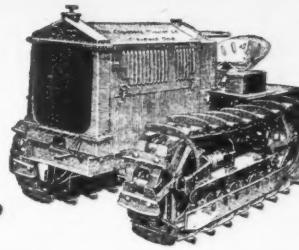
THE AMERICAN farmer will never reach his place in the life of the nation until he is able to sit down with the leaders of all other groups on an equal basis so that he can grasp and understand fully their problems as well as those of his own group and give expression to the farmers' viewpoints and the needs of the farmer group as intelligently as do the leaders for other groups that make up our national life," declared Gov. Howard M. Gore in addressing more than 400 farm men and women at the West Virginia Farmers' Week at Morgantown, during the week of January 10-14.

"THERE are seven mistakes of life that many of us make," said a famous man writer; and then he gave the following list:

1. The delusion that individual advancement is made by crushing others down.
2. The tendency to worry about things that cannot be changed or corrected.
3. To insist that a thing is impossible because we ourselves cannot accomplish it.
4. Attempting to compel other persons to believe and live as we do.
5. Neglecting development and refinement of the mind by not acquiring the habit of reading.
6. Refusing to set aside trivial preferences, in order that important things may be accomplished.
7. The failure to establish the habit of saving money.—Jim Hill-O-Gram.

Cletrac

"can do jobs that others refuse to work on"



Says This Experienced User

FRED NOHRDEN is no novice when it comes to tractors—and he knows what he is talking about in his letter. From actual experience he tells just how much better Cletrac is for orchard and farm work.

Why not decide today to find out about Cletrac—its "One-Shot" lubrication—short turning—easy handling, etc.?

Made in three sizes to fit all tractor jobs. Write for complete descriptive literature. Our nearest dealer will be glad to give you a demonstration.

THE CLEVELAND TRACTOR COMPANY
CLEVELAND, OHIO, U. S. A.

Just one spraying

for Control of Apple Aphis, Scale Insects and Red Mite



Rosy Apple Aphis cause deformed apples. They may appear in destructive numbers any season without warning. A one spray control, saving summer nicotine sprays, is possible with Sunoco applied from the "open bud" stage until the leaves are one inch long.

Sunoco costs less than lime sulphur and nicotine and covers 20% more trees.

Sunoco should not be classed with any other miscible oil on the market. It is always uniform; will not freeze; mixes easily with cold and hard water; is non-corrosive and pleasant to use.

Many large fruit growers' associations and city park departments have used Sunoco successfully year after year for a general clean-up of all scale insect pests.

Our entomological staff has prepared a booklet with spray schedules and uses of Sunoco.

It is free. Just use the coupon.

SUN OIL COMPANY, Philadelphia
SUN OIL COMPANY, Ltd., Montreal

Branches and Agents in Principal Cities



TERRAPIN SCALE (Peach Lecanium)
This is a dreaded pest, as it hibernates on the branches in the half-grown stage. It seriously attacks plum, sycamore, maple and peach.

Lime sulphur will not control it. In the Dover, Delaware, district peach and plum trees were overrun with this destructive pest. Practically every known killer (?) was tried and the Terrapin still thrived. About two years ago they began using Sunoco (1 part oil to 15 parts water) and today the district is practically cleaned up.



Learn When and How to Spray for Important Pests

Please send me, free, your valuable booklet, "Spray Schedules."

Name _____

Address _____

State _____

Mail to Spray Oil Department

SUN OIL COMPANY, Philadelphia, Pa.

Will Anyone Accept This Pipe-Smoker's Challenge?

Wedded to one tobacco for twenty-one years, veteran defies anyone to claim longer record

Twenty-one years is a long time to stick to any one product—particularly tobacco. Because even though over a period of years a tobacco may not change in flavor or quality, a smoker's taste generally does.

So it is all the more remarkable to receive such letters as that from Mr. Roberts of South Dakota, reproduced below. Evidently, there is something about the unchanging quality of Edgeworth Tobacco that keeps a smoker's taste unchanging, too.

Read Mr. Roberts's letter:

Columbia, S. D.
Sept. 9, 1926.

Larus & Bro. Co.,
Richmond, Va.
Gentlemen:

I am a veteran of the Edgeworth army, still in active service.

I make this claim, challenging all comers, to have smoked Edgeworth and nothing else but Edgeworth (when it was possible to get it) for a longer period than any other person within the scope of your territory.

I have smoked Edgeworth for twenty-one years and will soon start on the twenty-second.

I'll admit to having tried other brands, including so-called high-class, high-priced blends and mixtures, enough to appreciate and satisfy myself of the superiority of Edgeworth.

In all these years I have never had one can of Edgeworth that varied in flavor or otherwise.

I can enumerate other qualities of Edgeworth that its selection above all other brands for a term of twenty-one years testifies for my part, all there is to say for this most delicious and satisfying of all smoking tobaccos.

Yours very truly,
(Signed) J. J. Roberts.

To those who have never tried Edgeworth we make this offer:

Let us send you free samples of Edgeworth so that you may put it to the pipe test. If you like the samples, you'll like Edgeworth wherever and whenever you buy it, for it never changes in quality.

Write your name and address to Larus & Brother Company, 13-O S. 21st Street, Richmond, Va.

We'll be grateful for the name and address of your tobacco dealer, too, if you care to add them.

Edgeworth is sold in various sizes to suit the needs and means of all purchasers. Both Edgeworth Plug Slice and Edgeworth Ready-Rubbed are in small, pocket-size packages, in handsome humidores holding a pound, and also in several handy in-between sizes.

To Retail Tobacco Merchants: If your jobber cannot supply you with Edgeworth, Larus & Brother Company will gladly send you prepaid by parcel post a one- or two-dozen carton of any size of Edgeworth Plug Slice or Edgeworth Ready-Rubbed for the same price you would pay the jobber.

[On your radio—tune in on WRVA, Richmond, Va.—the Edgeworth station.] Wave length 256 meters.



By H. F. Wilson

Use of Package Bees and Nuclei

THE PACKAGE bee industry during the last 10 years has developed into a large and important part of the business of beekeeping. We have in the United States and Canada conditions which lend themselves very well to just such a business. In the clover belt of the northern United States and Canada, the spring period for producing bees is short, lasting only from April until the first of June. The period of nectar secretion for the main honey plants is short, lasting for a period of only two to eight weeks, depending upon climatic and soil conditions. It is therefore necessary to have colonies very strong in bees at the beginning of the honey flow. If colonies come through the winter short of bees, it is impossible to strengthen those colonies without adding bees from other sources.

Northern Growers Secure Bees from South

Since it is impossible to produce these bees to any extent in the short spring of the North, the beekeepers resort to shipping bees in cages from southern breeders. The conditions in the southern states are ideal for producing bees to meet the needs of the northern beekeeper. Except perhaps for a short period during the latter part of December and early January, bees can be produced the year round in the South, where the colonies normally start spring activity in January or early February. As a result, a spring honey flow for the southern beekeeper causes the development of large quantities of young bees, and usually during April and May there is a surplus which the southern beekeeper is glad to get rid of. These bees are sold in packages containing one, two or three pounds to the northern beekeeper. The combined conditions make it satisfactory for both parties.

Also, in the North, the season for rearing queen bees is very short, and a sufficient number of queens cannot easily be produced. Conditions for rearing queens in some sections of the South are quite satisfactory, and a good many beekeepers find it profitable to raise queens for shipping to the northern states and Canada. The business in package bees and queens now amounts annually to many thousands of dollars, and the result to the northern beekeeper is an increased production with a larger number of colonies, which would be impossible without the additional supply of bees from the southern states.

Winter Loss often Serious in North

Winter loss of bees is a serious problem in the northern United States and Canada. In seasons when large amounts of honeydew are gathered from the leaves of the trees and mixed with the honey, the bees are unable to digest bee stores properly, and 30 per cent of all colonies may die out any winter under these conditions. In the case of some beekeepers, the loss may be trivial, while with other beekeepers the loss may be 100 or more colonies. Without the available supply from the South, the beekeeper who has suffered serious losses would not only be required to spend several years in building up his apiary, but he would also lose the honey crop for that period of time and would have no income. Now, it is possible for him to ship from a few to a thousand packages of bees, with which he can build up fairly good

colonies by the time of the honey flow. Usually, the beekeeper can secure a sufficiently large crop to pay for the package bees and still leave a satisfactory profit.

Some beekeepers have gone so far as to declare that they could save money by destroying all colonies of bees in the early fall and replacing them in the spring with three-pound packages. But not many of our beekeepers would really care to follow this plan, because it is safer to try and keep the full colonies over winter in spite of the quantity of stores used by the bees during that period. When all conditions are just right, this plan would work quite well, but occasionally the spring conditions in the South are not satisfactory for raising package bees, and so far the demand has been greater than the supply. If the weather in the South is cold and rainy and the bees are unable to gather nectar in the field, broodrearing is curtailed and bees might not be available at just the right time for the plans of the man who has destroyed all of his bees in the fall.

Many Southern Bees Purchased in 1926

In the spring of 1926, the weather conditions were poor for producing package bees, and many thousands of package bees could not be delivered until too late in the season to be of much value. Furthermore, it sometimes happens that package bees are not handled properly in transit and die because of lack of proper shipping conditions. When this occurs, there is necessarily a certain amount of time spent in adjusting a settlement, and it is then too late for the northern beekeeper to secure a new shipment.

The shipping of package bees, and the handling of them by the northern beekeeper after they arrive, are not simple manipulations. The southern shipper has plenty of troubles, and the northern beekeeper must know his business in order to use package bees profitably. If package bees are prepared properly for shipment and are not delayed in transit, they may be expected to arrive in first class condition 95 per cent of the time.

If the northern beekeeper thoroughly understands bees and how to take care of them, he can be successful with package bees 95 per cent of the time. Even the inexperienced beekeeper can be reasonably sure of success if he fully understands what he is to do with the bees when they arrive and if he provides proper equipment and plenty of stores for the bees on their arrival.

Two Methods of Shipping Bees

There are two methods of shipping bees. One method consists of shipping bees loose in a cage with sufficient food to carry them through the journey, but without any combs. In preparing the bees for shipment, the breeder simply shakes the bees from the comb into the shipping case, places a queen in a mailing cage and attaches this inside the package so that the queen cannot escape. He then fastens the opening of the cage securely, and when the bees arrive at the apiary of the buyer, they are shaken into their new quarters, which have been supplied with combs and stores in the second method, bees are shipped with one, two or three frames of brood and are called nuclei.

In preparing the package for shipment, the breeder removes one, two or three frames with brood from a colony of bees, adds a queen and enough bees to make a standard package, and the package, properly prepared for shipping, is sent by parcel post or express.

Comparison of the Two Methods

A common question among beekeepers who buy bees from the South is whether or not they should buy combless packages or three-frame nuclei. A few states have laws which regulate this matter, and the beekeeper should first inquire of the state apriary inspector concerning the regulations pertaining to the shipping of bees into his particular state. If there is no law regarding the matter, the beekeeper must then decide for himself as to which plan he wishes to follow. Nuclei are probably more desirable, as they constitute the nearest conditions to a normal colony. By shifting the frames and bees to a new hive at the receiving point, the beekeeper has a fairly good colony already under way. If additional drawn combs are given to this colony, he will have the nearest approach to a normal colony of bees at the beginning of the spring period. The one serious danger connected with bringing in package bees containing combs is the possibility of introducing American foulbrood. A beekeeper may do irreparable damage to an otherwise clean apiary by introducing one diseased nuclei. We know that all of our reliable breeders are making every effort to avoid shipping diseased bees, but as American foulbrood is more or less distributed all over the United States, it is quite difficult for the most reliable beekeeper to prevent disease occurring in his yard at occasional periods. If disease is known to occur in the section of the state in which you wish to buy package bees, it will be safer to secure combless packages.

Best Time to Receive Bees

There is some debate as to the best time for receiving package bees in the spring. Experience is necessary for each individual beekeeper to determine the best time for his particular locality. Climatic conditions will, to a large extent, determine the best time for having these bees shipped. Arrange for your bees to arrive after the first cold spring period. If they arrive too early and the weather is cold and the bees are unable to get into the field, they will not be able to rear brood abundantly, and very often the package bees are weaker when warm weather does come than they were at the time that the shipment was received.

For strengthening old colonies, one or two-pound packages without the queens are very satisfactory. But for starting new colonies, not less than three pounds should be used for each colony. If you are planning to secure package bees this coming spring, read over the advertisements in your bee journal, select one of the breeders whose advertising is shown, and make arrangements with the breeder early to get your bees at the proper time. Some of these breeders will undoubtedly have early orders for practically their entire product for this season, and you may have to write to two or three breeders before your order can be accepted.

New Bulletin on Planting Fruit Trees

BEGINNERS in fruit growing, as well as many persons who have been in the fruit business for a long time, can get much information about transplanting fruit trees from Bulletin 245 by T. J. Talbert, which has just been issued by the Missouri Agricultural Experiment Station, Columbia, Mo. The bulletin presents in clear and condensed fashion a great deal of valuable information about the handling of fruit trees from the time they are removed from the nursery to the time they are established in the orchard.

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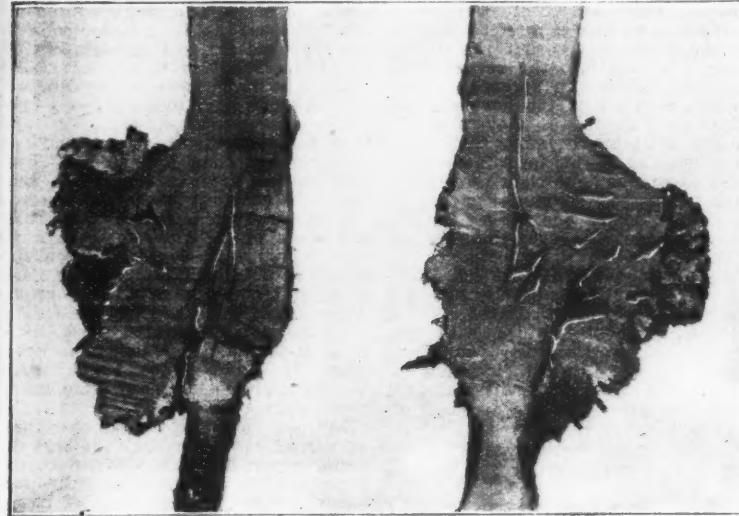
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Crown Gall and Graft Knots of Apples

(Continued from page 4)

The nurserymen as a whole want to deliver sound trees to their trade the same as any business man enjoys selling a "number one" product. The American nurserymen are not questioning the injury caused by galls or graft knots to apple trees. Their desire is to be told how they can prevent this loss in their apple blocks. Our new understanding of the problem affords a more hopeful outlook for its control than ever before. The prevention of graft knots is tied up with the selection and care of stock and scion material, with better grafting, with the care of the grafts in storage

and the satisfaction of selling good healthy trees. The financial benefit will be accrued largely to the apple consumer through better and cheaper trees for the orchard. It was doubtless this altruistic motive, coupled with the fact that the nurserymen had already contributed \$13,000 over a two-year period from their own funds, that enabled the crown gall committee of the American Association of Nurserymen, consisting of Henry Chase, Chase, Ala., George Marshall, Arlington, Neb., W. G. McKay, Madison, Wis., and John Fraser, Huntsville, Ala., to secure the co-operation of the United States government, the Uni-



Two-year-old cut back Wealthy trees showing an excessive development of callus at the tip of the scion lip. Failure of the scion lip to unite with the stock resulted in the formation of these knots.

and when set in the field, and with conditions that do not stimulate excess callus formation. Much can now be done toward the solution of this phase of the problem by the nurserymen themselves.

Cheaper and Better Trees for Orchardists

It is probable that no large financial returns will ever accrue to the nurserymen from the solution of this problem. Their returns will result from the elimination of a heavy waste

versity of Wisconsin and the Iowa State College in helping to finance and direct the investigation of the problem.

It is significant that such a broad co-operative relationship has been established between so large a specialized industry on the one hand, and these three institutions whose functions it is to solve problems of large importance economically to the public. Certainly, it is a worthy example that may well be followed by other organizations.

Soil Management in Northwestern Apple Orchards

(Continued from page 5)

in the spring. Under severe conditions it may be of value during July if water penetration is difficult to secure.

Manure In Ditches and Potholes

Plowing, subsoiling and even blasting are temporary relief measures employed to overcome hard pan conditions to insure water penetration during the growing season. Cover crops, even though bulky, have been slow in overcoming the low organic content of our semi-arid soils. It has been necessary to apply barnyard manure and other bulky materials to give a more permanent remedy. Manure spread in large irrigation ditches and sometimes in side-pocket ditches gives satisfactory results when the condition is not severe. Potholes filled with manure is the last resort and nearly always brings tree out of the severest hard pan condition. The potholes are at least two feet deep and about four in number to the tree, placed so that the water from an irrigation rill will run through them.

NEW JERSEY has adopted the standard rules of the United States Department of Agriculture for the grading of apples, peaches and potatoes, according to an announcement of the state department of Agriculture. The nation-wide use of one set of grade terms, in the belief of the department, will help the sale of the products, since buyers seem to greatly favor this simplified form. Adoption of the government grades is not compulsory but their acceptance obligates growers to fulfill requirements.

should never be wasted. Instead of being applied broadcast, it will be of greater value to the soil in the way of water penetration if applied in the irrigation furrow.

I have touched on most of the important phases of soil management and fertilization in the apple orchards of the Northwest. However, the discussion is far from being complete in every detail. Some of the methods now in use may change, due to new findings in soil experiments. It is my belief that the permanency of the apple orchards of the Pacific Northwest is largely dependent on solution of the soil problems as they appear so that the present high production may be continued indefinitely.

Potholing of trees is a common practice in the Wenatchee district and I believe has saved as many trees and apples as any one supplementary orchard practice. Barnyard manure is very scarce in many sections of the Northwest and



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Profitable Poultry

By Ralston R. Hannas

March—The Chick Month

LAST MONTH a few points were discussed in connection with the brooding of early hatched chicks. This month we shall take up in more detail a few points on the brooding of chicks in the normal season. The heavier breeds, such as the Reds, Rocks and Wyandottes, should be hatched this month, while next month is the normal Leghorn month.

First Care

The first care chicks receive is important. Many of the troubles that affect chicks later on may be traced directly to the care they received during the first week. Under no circumstances should chicks be fed for at least 60 hours after hatching—72 hours is better. Just before hatching, chicks are provided with enough material to last them this length of time, and if anything is given to them, the small digestive system is thrown out of order. To be sure, chicks will scratch almost as soon as they are hatched, but this does not mean that they should be fed. Sympathy for the babies should not enter into the case at all; in fact, one does them a harm rather than a kindness by feeding them sooner than I have indicated. Milk or water may be given them, however, at this time.

Naturally, there should be a fire in the brooder stove; it should be there several days before the chicks are put under the hover. A half-inch covering of sand on the brooder house floor with a litter, on top of the sand, of fine cut alfalfa, cut straw, alfalfa leaves, clover leaves, or buckwheat hulls, will help to make the floor warm and will provide good material in which the chicks can scratch. A dusty litter, such as hay chaff, is not good for the chicks.

Some means must be provided for the first couple of days the chicks are under the brooder to keep them from wandering away from the source of heat. This may be done by making a circle of inch mesh wire, a foot and a half or two feet high, around the brooder stove at a distance of a foot from the edge of the hover. Covering this wire with feed bags or similar material will help to break up any drafts there might be on the floor. This wire circle should be kept up for the first two days and should be put up nights for the first 10 days.

Necessary Equipment

Any kind of house may be used for brooding as long as it is not full of cracks that will let air into the house and cause drafts. A house 10 by 12 feet is a good size and will accommodate as many as 300 chicks—250 is a better number, however. There should be a board or concrete floor. The front should face the south and have windows that are at least a foot from the floor. At least one of the windows, preferably one near the roof, should be so arranged that it may be opened in such a way that air will not blow directly on the chicks.

Three drinking fountains should be provided for 300 chicks and at least two mash hoppers, each three feet long. Any of the different types of hoppers that are used are satisfactory. Home-made hoppers, three feet long, 10 inches wide and three inches deep, with an inch strip all around the top edge to prevent wastage, are satisfactory.

The Chicks Need Warmth

All young animals need warmth; chicks are no exception to the rule. Heat is one essential in brooding. The temperature under the hover should be 100 degrees Fahrenheit for the first two or three days, after which it can be reduced gradually at the rate of about a degree a day until the temperature reaches 80. It may be necessary to hold this for a couple of

weeks or even longer, depending upon what kind of weather prevails. The temperature may be reduced rapidly after this if brooding is being done in the latter part of the season.

It is good to have a thermometer handy to know for sure what the temperature is, but the correct temperature can be fairly accurately gauged by the way the house feels to the attendant and by the actions of the chicks. If chicks stand around with their mouths open panting for air, this is a pretty good sign that the room is too hot, and something must be done to relieve conditions. On the other hand, if the chicks huddle together and crowd toward the stove, this is a good indication that the room is too cold, and something must be done to raise the temperature as soon as possible.

How Shall They Be Fed?

There are a number of ways of feeding chicks, and all of them may give good results. My advice to anyone who has a good method of feeding chicks—one that he knows has given good results—is by all means to continue with that method. If, however, his old method has not given good results, or if he is uncertain as to just what method he wants to use, let him follow a method that has been used successfully by someone else. He should not experiment with a mixture of his own design that he knows nothing about or with one that someone tells him of, about which his informant is uncertain as to the results.

In the first place, the chick feeds put out by the big commercial feed companies are good feeds. They have been developed by these companies under the supervision of men who were trained in this branch of the work, and these feeds have been tested on the companies' plants; these feeds contain the best of material and are mixed much better than an individual can mix them; they are uniform in quality. It is, therefore, safe, and, indeed, advisable to use these feeds, as well as the system of feeding recommended by the concern making the feed. The formulas that are given below may be used by those who prefer to mix their own feeds.

Mash and Grain Feeding

When it is time to feed the chicks, that is, after they are from 60 to 72 hours old, they may be given a scratch feed composed of equal parts of fine cracked yellow corn, cracked wheat and pinhead oats. This scratch ration is to be fed five times a day for the first week, four times a day for the second week, and three times a day beginning with the third week and until the chicks are put on range, that is, taken away from heat. In the second week, the mash is put before them and is kept before them from then on. If a home mixed mash is fed, it may consist of 20 pounds yellow corn meal, 20 pounds red dog flour or highest grade flour middlings, 20 pounds ground rolled oats, 20 pounds wheat bran, 10 pounds meat scrap (55 per cent protein), five pounds dried milk (either skim milk or buttermilk), three pounds tested cod liver oil, two pounds oyster shell meal, and one pound salt. This is the ration recommended by the New Jersey College of Agriculture.

Liquid milk should be kept before the chicks all the time, at least for the first six weeks of their lives. If it is available, it can be used to good advantage all through the rearing period also. Beginning with the second week, green food in some form should be given the chicks.

Things to Watch

Get the youngsters outside as soon as possible. They are ready to go

out by the time they are five days or a week old. A temporary fence should be built for them, as well as a runway from the chick exit door to the ground, the runway to be sufficiently wide enough and of easy ascent so the chicks will have no trouble in getting either out or in—especially in. If it is difficult for the chicks to get in because of a poorly constructed runway or an exit door that is too narrow, many chicks may be injured by trampling if it is necessary for them to get in in a hurry. Watch them carefully for the first week or 10 days after they are first allowed out to see that they learn the way back into the house when they get chilly—don't go away and leave them to themselves.

Keeping the temperature so the chicks are comfortable will help to prevent crowding. Put boards, or cardboard, or wire across the corners of the house to prevent the chicks from crowding into the corners. See that the babies are spread out just inside the edge of the hover in the form of a circle. If they are not spread out properly, move them until they are, and do this for a few nights. This should be done right after dark, and, of course, the chicks should be looked at before one retires for the night to see that everything is all right.

Should toe-picking break out, darken the house immediately, and remove the chicks that have been picked. Treat their toes with tar. Feed often to keep the youngsters scratching and to get their minds off themselves. No additional food should be given—merely divide it up in a number of feedings.

Time of Planting Depends on Locality

WHETHER or not fruit trees should be planted in the fall depends on the locality in which they are to be planted, says Prof. M. A. Blake of the New Jersey Agricultural Experiment Station. Cherries, for instance, which make their growth early in the season and then stop for the year, are best suited for fall planting. When set in the spring, they fail to make much growth, and a considerable number are likely to die.

Apples and peaches often make a late fall growth in the nursery under favorable conditions. Such trees, if planted late, are likely to be severely winter injured, especially if a cold winter follows. In districts where frost heaves the soil in winter, fall planted trees may be so loosened that the roots will be dead when spring opens.

In New Jersey, the soil and climatic conditions are more favorable for fall planting than in localities farther north. The soil seldom freezes until after November 1, and the sandy loams remain in a mellow, workable condition. Well ripened trees may often be planted in the fall under very favorable conditions.

Prof. Blake cautions growers never to set trees in soil so wet and sticky that it packs into lumps or clods. Dry soil should be packed very firmly about the roots of newly planted trees. Air spaces left about the roots between clods of soil are almost certain to cause the death of the trees.

Object to Term Alligator

THE CALIFORNIA avocado growers seriously object to the use of the term "alligator pear" in connection with their product. They maintain that the term is entirely inappropriate for such a dignified product as the avocado, and they are therefore appealing to the public to discontinue its use.

Over \$20,000,000 are invested in the avocado industry by California growers. The industry has been 50 years in reaching its present status. At present there are approximately 500 large orchards in California devoted exclusively to the growing of avocados. To date California has consumed almost the entire crop, but within the last few years production

has reached such volume that steps are now being taken to develop outside markets. The growers expect that the larger production of avocados in California will soon make it possible to sell the fruit at such low prices to eastern consumers that the use of the avocado will become general.

Cold Storage Helpful to Fruit Seeds for Propagation

COOLD storage control in the germination of seeds may mean savings of millions of dollars to nurserymen, horticulturists and foresters, according to Dr. William Crocker, director of the Boyce Thompson Institute for Plant Research.

At the meeting of the American Association of Ice and Refrigeration at Washington, D. C., Dr. Crocker pointed out the need for cold storage control in the germination of seeds. Many seeds that nurserymen, horticulturists and foresters have found it costly and difficult to germinate, especially hybrid seeds produced at a great expenditure of time and money, have been killed because they were not kept at a constant low temperature.

Studies at the institute show that the seeds of the rose or apple families, stored at 41 degrees Fahrenheit, produced seedlings, while those held at other temperatures failed to grow. Apple seeds held at 41 degrees for 75 days germinated, while those held even at 50 did not. Such facts have been worked out for 30 different genera of plants and many more varieties and species.

But to regulate the temperature closely enough to produce the best effects, controlled cold storage conditions are necessary, especially for seeds needing a long period of treatment and a narrow range of temperature. The extra expense involved seems warranted, since such great losses are involved. One western nurseryman who had 750,000 Norway maple seedlings, reduced by a late freeze to only 120,000 plants, said that it cost him thousands, and he now keeps half of such seeds in cold storage to make the time of germination suit the planting time.

Another scientist who has been for years hybridizing peaches, producing seeds at great expense, has discovered through the institute's studies that he has been losing nearly all of them because they have been held at freezing temperatures. The resulting increased production, at decreased loss of time and money, should make cold-storage control of germinating temperatures profitable, even with some added expense.

Apple Varieties and Fruit Setting Factors

(Continued from page 35)

trees to exceptional vigor. However, it appears that heavy pruning is more effective in increasing the fruitfulness of the varieties Arkansas, Arkansas Black, Delicious, Nero, Rhode Island Greening and Stayman Winesap than heavy fertilization. All parts of the trees should be stimulated to a very vigorous condition. This can best be done by cutting out small branches around the entire surface of the trees rather than by heavy heading back of a few limbs. The upper center of the trees should also be well opened up, not only to stimulate vigor but also to allow the fruits to color well. Trees so pruned should receive at least the normal application of sodium nitrate or ammonium sulphate. Increased amounts may be necessary if the trees are in heavy sod.

Think of That!

A man had been visiting a certain widow every evening.
"Why don't you marry her?" asked a friend.

"I have often thought about it," was the reply, "but where would I spend my evenings then?"—Kasper, Stockholm.

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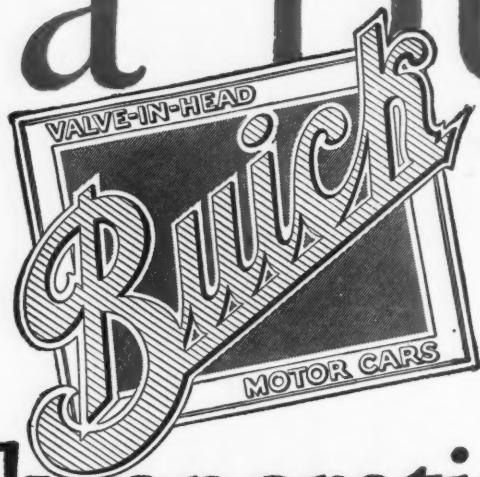
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